The AMERICAN

RIFLEMAN

THE RIFLE 1885 ARMS & THE MAN 1906

SHOOTING & FISHING

~1885 to~ ~1906~

VOLUME LXXV NUMBER 1

"Happy New Year"

$3.00 the year JANUARY 1, 1927 25 cents the copy

Portland Military Team which won the United States Revolver Association Match. Left to right: C. B. Maxwell, C. F. Shaylor, J. H. Young, and Wm. L. Oxley.

New World's Record with the Ⓟ Brand

IT'S GETTING quite common the way rifle and revolver teams are breaking world's records with Peters Ammunition. Recently the Portland Military Team shooting Peters Ammunition won the United States Revolver Association Match for the Winans and Poindexter Trophies with a score of 805 x 1,000, five points higher than the previous world's record.

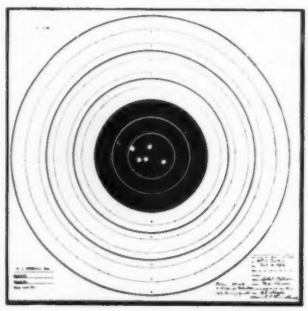
At the same time and place, and also using Ⓟ Brand the Portland Police Team won the Northwestern International Revolver Association Matches with a score of 2,182 x 2,250.

Last Summer it was the Deerfield Gun Club using Peters Ammunition that hung up a new world's record with its score of 1,975x 2,000.

No ammunition can ever win a match but Peters Ammunition always helps the shooter to win by giving perfect support to his shooting skill.

Loaded to uniform velocity and constructed with perfect coordination of powder, bullet, and primer, it spins where you hold and hits where you sight every time.

Try a box for your pistol, revolver or rifle, and experience a new shooting delight of smaller groups and higher scores. To try the red Ⓟ brand once is to use it always.



A Possible!

And what a group it is! It takes a steady hand, a keen eye, and straight shooting ammunition to make a group like this with a revolver at 50 yards. It's a group made by Wm. L. Oxley in the United States Revolver Association Match at Seattle Washington. The firing was done in 14 seconds.

Congratulations Mr. Oxley.

Try Tack-Hole .22 L. R. for better shooting in your small bore work. Nothing like it for small groups and record scores. It's the world's most accurate small bore cartridge.

THE PETERS CARTRIDGE COMPANY

DEPT. A-26

CINCINNATI, OHIO

New York **Los Angeles**

PETERS AMMUNITION

Studying the Scorebook

THE OLD score-book, tattered and torn, is closed. A new one with bright, clean leaves lies open before us. By studying the groups in the old book, the scores registered in the new should be materially improved.

The old score-book is labeled "1926"; the new, "1927." As we study the shots in 1926, isn't it true that the principal drawback to a "possible" score has been a tendency to shoot too low? Haven't we, in order to play safe, been aiming at the bottom of the targets instead of taking an honest, six o'clock hold under the black? Once or twice we may have overshot, aimed too high in a desire to make a good showing. There are recorded a few real "unaccountables." They looked good when we let them go, but they just didn't land. But for the most part we got what we held for and we were holding a little low in the knowledge that if worse came to worse we might get a ricochet through the target.

For 1927 let's adopt the slogan "aim higher." The country is more nearly ripe for rifle and pistol shooting than it has been at any time in the twentieth century. With THE AMERICAN RIFLEMAN going to every member it will be possible to deliver a more accurately controlled fire on our objectives—"America, a Nation of Riflemen"—than has ever been possible in the fifty-five years of the National Rifle Association's history. With the police departments waking up to the necessity of a straight shooting program, it is going to be easier for the civilian rifle club to gain the support of its local officials and newspapers than ever before. With rifle shooting well established as an intercollegiate sport, the game will receive much new publicity and the civilian rifle clubs have opened up to them a field for recruits of the highest caliber as these college riflemen are graduated and return home to go to work.

In years past it has probably been the course of wisdom to play safe and hold low, because each of us was playing more or less of a single handed game. We knew the general direction in which we were shooting but we didn't know whether or not the other fellow might also be firing on our target. In 1927 THE AMERICAN RIFLEMAN will keep every club and every member, from Alaska to the Canal Zone, informed as to the way the wind is blowing and as to the proper target at which we must shoot in order to obtain the maximum effect.

The way seems to be paved for advance which will make rifle shooting history this year. Aim higher, hold hard, follow the dope as it comes to you through THE AMERICAN RIFLEMAN, and when we close the score-book for 1927 it will show a series of advances over our 1926 record which will bring joy to the hearts of all those good men and true who want, above all things, to make America once again a Nation of Riflemen.

APPLICATION BLANK

NATIONAL RIFLE ASSOCIATION,
1108 Woodward Bldg., Washington, D. C.

There is only one way to go—forward. I am attaching { $3.00 for Annual Membership / $25.00 for Life Membership } for

Mr. _____

Street _____

City and State _____

whom I can heartily recommend for membership in our Association.

Fraternally,

_____

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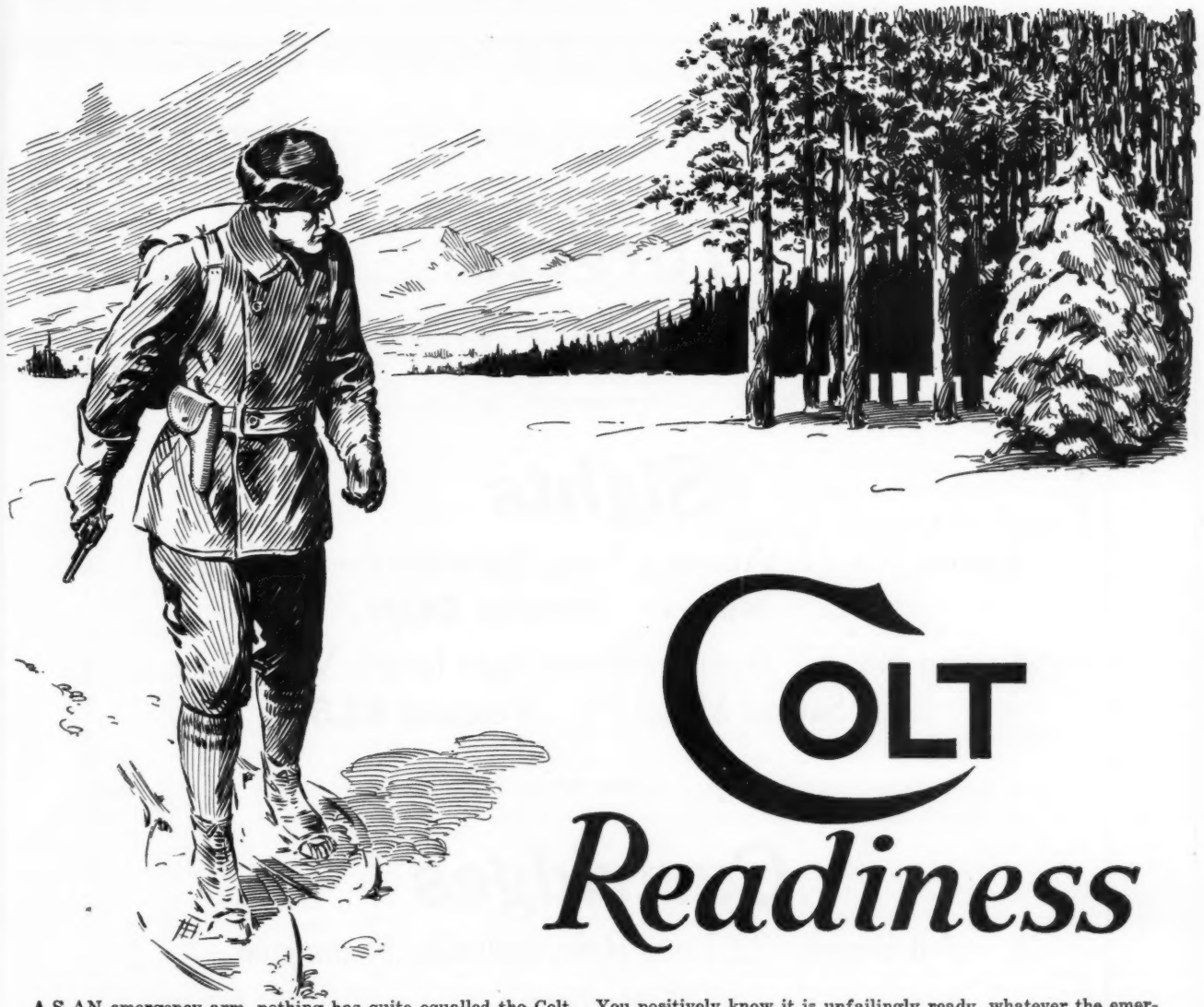

COLT
Readiness

AS AN emergency arm, nothing has quite equalled the Colt. You positively know it is unfailingly ready, whatever the emergency. Something stirs in the thicket—you stop and draw your Colt. It may be a hare or a grizzly—they're all one to the Colt—you're ready for a quick, accurate, unhurried shot. But not *until your ready.*

The Colt safety feature insures that there will be no accidental discharge. The safety of any Colt Revolver or Automatic Pistol is as proverbial as its readiness. The knowing hunter, sportsman, traveler assures himself of both, for he chooses a Colt.

COLT

Catalog shows the complete line of Colt's Revolvers and Automatic Pistols. Want it?

COLT'S PATENT FIRE ARMS MFG. CO.
Hartford, Conn.
Pacific Coast Representative
Phil. B. Bekeart Company
717 Market St.
San Francisco, Calif.

Colt New Service Double Action Revolver

MEN WHO KNOW *what a* COLT WILL DO

Another Important Ammunition Development By Western

Two New 38 Super Police Cartridges

With the Stopping Power of the 38-40, 44 and 45

SUPER BULLET IS USED BY OFFICER IN KILLING BANDIT

Highwayman Dies When Spinal Column Is Shattered by Leaden Pellet.

Using a new "super police cartridge," similar to the old dum-dum bullet, Motorcycle Policeman Robert M. Sweeney, of the East St. Louis force, last night shot and killed one of a pair of highwaymen, while another policeman captured the second robber. Two others were with the pair earlier in the evening, were arrested today.

Sweeney fired only one shot at the fleeing robber who failed to heed his command to halt. The special bullet, made of soft lead, struck Kautsky in the spine just below the belt, flattening out, making a wound as large as a quarter and shattering the spinal column. The wounded man was rushed to St. Mary's Hospital, where he died on the operating table.

The new ammunition is available only to police and sheriffs, and is made by the Western Cartridge Company at Alton. It is a .38 caliber cartridge, with the power of a .45 caliber, and has a long lead bullet, intended to spread when it strikes. It was adopted two monts ago by the East St. Louis force, and this is the first example of what it will do when it strikes a human body. It also is in use by the Chicago police, and has been tried out by the department here.

38 Super Police
38 Special Super Police

AFTER careful study of the peace officer's needs of today, Western has developed two new Super Police cartridges for the .38 and .38 Special which give to these popular arms the stopping power of the heavier .38-40's, .44's, and .45's. They have been developed at the request of police and in cooperation with them.

The news item at the left, reproduced from *The St. Louis Star* of November 16, throws interesting light on the effect of these cartridges in actual use.

Both cartridges have a 200-grain, round-head lead bullet and are adapted to solid-frame pistols which are chambered for the .38 Police Positive or S. & W., or the .38 Colt Special or S. & W. Special cartridges.

Velocity is well over 700 feet per second, while the accuracy of the two new loads is equal to the old lighter weight standard cartridges at all ranges and superior at the longer ranges.

The new loads are comfortable in the hand, with very little more recoil than that of the standard cartridges. They strike center at 50 yards. At shorter distances the point of impact is a few inches higher than the lighter loads, making a slight lowering of the rear sight advisable, the amount depending upon the shooter and the type of sights used.

Super Police cartridges have already been adopted by many of the country's leading police departments and are being tried out by many others. For the time being, distribution is being restricted for police officers' use.

With this important improvement in the effectiveness of police ammunition, The Western Cartridge Company has again demonstrated its leadership in the development of better ammunition for every shooting purpose.

WESTERN CARTRIDGE COMPANY

125 Hunter Ave., East Alton, Ill.

Branch Offices: Hoboken, N. J., Tacoma, Wash., San Francisco, Cal.

Western

World's Champion Ammunition

TABLE OF CONTENTS

FUTURE MATCH SCHEDULES

Clubs are invited to list their matches in this department. Notices must reach the AMERICAN RIFLEMAN two weeks before publication date.

SOLON SPRINGS, WIS.—Thirty caliber. Range, five miles northeast of Solon Springs. Small-bore range, one-half mile west of Cosgrove Hotel, in Solon Springs.

SEATTLE, WASHINGTON—Shooting every week. Visiting riflemen or pistol shots should communicate with C. C. Finn, 323 Coleman Bldg., Seattle, Wash.

STEUBENVILLE RIFLE AND PISTOL CLUB, STEUBENVILLE, OHIO—For program and details apply to W. Russell O'Neill, 1319 Oregon Avenue, Steubenville, Ohio.

Let's Beat the Swiss

THE Swiss, who last year took the rifle championship of the world away from America, have picked their International team, and have placed it in intensive training. It is time for America to get its team together and train it.

In order to do this it is necessary to ask the shooters of the country to contribute to a fund for the International team. Each shooter who wants to help America regain the title is asked to contribute at least one dollar. Pin your contribution to the attached form and send it to the National Rifle Association, 1108 Woodward Building, Washington, D. C.

I wish to be credited with $.....as my contribution to the International Team Fund.

Name .....

Address.....

.....

P. S.—If you don't want to clip the magazine, write your name and address on a piece of paper, pin your contribution to it and mail to the National Rifle Association.

The AMERICAN RIFLEMAN

The Publication of The National Rifle Association of America

Entered as second-class matter, April 1, 1908, at the Postoffice at Washington, D. C., under Act of Congress of March 3, 1879

Vol. LXXV, No. 1 WASHINGTON, D. C., JANUARY, 1927 $3.00 a Year. 25 Cents a Copy

"Killed in Action"

By John Hubbard West

"ALL I know is that every time we strengthen a spot for a raid they hit us where we've drawn the men from. What I want to know is—why?"

The chief of staff for the commanding general snapped out the message with military conciseness, in reply to Bill Conway's request for details in connection with the job to which he had curtly assigned us.

Conway and I had been summoned to headquarters after a particularly disastrous failure of an attempt to straighten out the British line in Sector G of the great line of fortifications that had been dug across Belgium and France in a frenzied attempt to skid the German steam roller into a ditch. Conway had been summoned because he was the ace of the British military intelligence division. I had gone along because for some strange reason Conway liked me as a working partner. And we worked in pairs ferreting out the threads of the German spy web inside the Allied lines in 1915. We had to. It is no trick at all to cause a lone investigator to disappear from a front-line area in war time. Getting rid of two without leaving a trace is not so easy.

When informed of the general nature of our mission, Bill curled his short, stout body tailor-fashion in a chair—a breach of military courtesy habitual with him, and universally overlooked because of his uncanny ability in finding out what his superiors wanted to know—scratched his red head and began asking questions.

The chief's curt summary of the situation was all the information he got. For a moment his boyish face took on a troubled frown. Then I read the light of hesitation in his blue eyes, followed in an instant by a flash of decision.

He unwound himself from his chair, snapped to attention, and spoke:

"In that case, sir, I'm afraid there is nothing I can do."

"Do you mean, sir, you are—er—declining this assignment?"

The general's face was purple. One doesn't "decline" assignments in the army.

"Oh, no, sir," Bill's tone was conciliatory. "I am a soldier and obey. But I cannot see any hope of concluding my work successfully. I merely wanted you to understand my feeling, sir. That was all."

The general's wrath melted a bit at the implied apology, but there still was a trace of irascibility. His attitude confirmed a belief I had been acquiring for some time, that line officers never should be permitted to deal directly with field operatives of the intelligence section. They should be required to transmit all their requests to the chief of section, letting him work out the details of accomplishment with his agents, whose limitations he understands. The line officer is accustomed to obeying and to being obeyed. He does not realize that he cannot tell an intelligence operative to "solve me this mystery by 9 a. m. tomorrow" and expect the same punctilious accomplishment a subordinate in the line accords him when told to "march ten mlies by sundown."

The general was a line officer of most conventional tradition. He couldn't understand why an intelligence operative was justified in saying, "I can't," when a platoon leader would be court martialed for the same thing. He made his view plain.

"Now, sir," he concluded, "Can you give any reasonable explanation for your very apparent—er—reluctance to obey orders?"

"I think I can, sir."

"I'd be glad to hear it."

"In the first place, from what you have told me, I can be certain only of a fact we all know—that the enemy is getting information from inside our lines, just as we are getting it from inside his. This information, at present, appears to be transmitted with a facility and speed we have not been able to match. To act effectively we must have some idea of the location of the enemy operative. Nothing you have told me carried a clew to that. And the nature of the information being transmitted is such that it might be transmitted from the high command or any of the army, corps, or division headquarters. Most of it could have been obtained from any brigade headquarters. To start out on such a meager foundation would make it necessary to investigate every headquarters, from that of the high command down to the last and newest brigade. Before that could be done, sir, the war would be over."

The general saw a light, and grunted acquiescence.

"But I have told you all I know, sir," he explained. "What more can I do?"

"Let me go over a map of the sector with you. Tell me what you can about the happenings in each section, give me the details on actions, raids, and the like. In the relation of any of these to the whole situation we may find the clew we need. I'm satisfied that whoever is supplying the enemy with this information is doing it under the eyes of the whole army and that his method is so simple and obvious that its very nature keeps him above suspicion."

The general grudgingly consented. He spread out the maps and, surprised at the facility with which Conway followed him, went over the history of the sector since he had held it.

Here an attack had been smothered by a counter attack before it could get well started. There the enemy had stormed a section of trench after all but a skeleton defense had been withdrawn for use elsewhere. Here a similar thing had happened. In each case the lost ground had been retaken at a heavy premium in lives, and the uncanny accuracy with which the enemy was striking was beginning to affect morale.

One small section seemed to have escaped the general havoc wrought by the efficiency of the enemy's spies.

"Captain Carlton holds it, sir," the general explained. "In line for promotion, too, I can tell you. Wish we had more like him. Hates the damned Bosh, sir, like the very devil. Always ready for 'em. Smothered every attack that's been made on him before it got well started. Never caught napping. Peculiar chap. Most officers are jolly well pleased for a few quiet days. Not Carlton. Strafs 'em every day or two when nothing happens. Runs a machine gun himself, I'm told. Holds his line with a mere handful of men, too. Offered to take over more trench with present force if we needed

replacements elsewhere. Don't see how he does it. But he does. That's all I need to know."

Conway looked thoughtful.

"You don't suppose, general, that the enemy is deliberately misleading Carlton with delusions of valor, do you?"

The remark was a bit too deep, in its flippancy, for a member of the staff tribe.

Bill elucidated.

"Isn't it possible that the enemy allows Carlton to win with greatly inferior forces so that there will be a loose spot in the line—through which a courier can make his way back and forth?"

"By Jove! I'd never thought of that. Yet there has been some heavy fighting there. The enemy has lost considerably."

"But the enemy has smashed through some of the most valient fighters in the world, general, when he really wanted to break through—and what does the enemy high command care for a little cannon fodder when the sacrifice is necessary to keep an invaluable line of communication open."

"One small section seemed to have escaped the havoc wrought by the enemy's spies."

"I'll reinforce that line at once," grumbled the general.

That was typical "staff." Reinforce the line and probably scare our bird away from any trap we might be able to set. Bill had a job inducing him to let the line alone. He explained that after all he might be in error and pointed out that, since Carlton was holding and men were sorely needed elsewhere, he did not care to be responsible for advising any change in assignment of troops.

But as we left headquarters he told me he was certain that the news was getting through the quiet sector.

"We'll go take a look at it," he remarked.

Next day we did. Posing as runners seeking a fictitious staff officer supposed to be along the line on inspection, we had the run of the entire front line. Tommies eyed us jealously as we disclosed possession of a bountiful supply of cigarettes, and officers grinned at us approvingly as we shared our wealth with the less fortunate front-line warriors. We loafed along in the manner in which all good soldiers given a loafing assignment are expected to loaf. In active sections we found the men wishing things would quiet down. And in quiet sections we found them hoping things would remain quiet.

" 'Ope the blighters don't make a move until the bloody war's over," one Tommy, on whose tunic there was a decoration for valor, confided. "I'm getting jolly well fed up on this blasted pig sticking."

And then, a dozen yards down the trench, and just around a bend, a rifle cracked. "There it goes," he grumbled. "Some blasted new one's tryin' to be a bloomin' hero. Got to do 'is bit o' hate, the beggar, to show 'ow brave 'e is, the blighter. Now we'll get bloody well strafed for an hour or so."

With that he led us to cover, and sure enough, within a few moments the German artillery opened up and pounded that piece of trench with everything they had for an hour. Later, we learned that a new recruit, who had not learned the front line rule of "Don't stir up the animals without good and sufficient reason," had seen the top of a German helmet bob up above the trench across No-man's land and had taken a shot at it. The Germans had answered it—as they always answered such breaches of etiquette—with an hour of devastating "strafing."

Always we found it thus—men contented with the quiet, and loath to do anything that might disturb it—until we reached Carlton's line. Here was a different atmosphere. The fighting Carlton had imbued his men with something of his own spirit. If a German head showed, it drew a shot. But there was no answering drum-fire. Here men cursed the high command for holding them back.

"We'd chase the blooming blighters across the Rhine, if they'd let us go," grumbled one hard-bitten Tommy. "They don't dare straf us—we'd raid their bloody trenches if they did," another boasted.

There was no denying that Carlton's outfit was hard. Yet their foes across No Man's Land seemed to take some delight in baiting them.

As we stood at a peep-hole we noticed insulting legends on large placards displayed above the parapet on the opposite side. This, the soldiers told us, was a daily occurrence.

It annoyed them, and they explained that it frequently drove the captain berserk. The "Gott Mit Uns" legend appeared to be his pet aversion, for every time it appeared, he went to a machine gun, chased the gunner away, and in person sent messages of his disapproval screaming across to the enemy lines. Every inch a soldier, he was, tall, lean, towheaded, with a ram-rod carriage a bit unusual for a British officer. In his pale eyes was the gleam of the crusader, almost of the fanatic. To see him was to understand how he fired his men and how he held his lines in the face of superior forces. He was the type that dies with a smile for the cause it believes in, and counts the price well paid.

When we saw him, he was running the machine gun in efficient short bursts that revealed him as a master of the weapon. His fire was as rhythmic as a telegraph instrument. It must have been effective, for the "Gott Mit Uns" sign disappeared.

There was little chance of enemy runners getting through that line. Carlton and his men were too alert. Bill admitted it, yet the place seemed to have a fascination for him. Next day, when an attack order was to be issued, Bill maneuvered so that he was sent to Carlton with the orders from regimental headquarters, and later—after dark—with orders countermanding the original orders. The attack was off, as was the shift in troops. But the Germans must have had plans of their own, for Carlton, ever alert, apparently caught sight of creeping figures beyond his parapet, which we could not see, sounded the "stand-to," and opened with his machine gun. He swept the field with it and for a moment it seemed the attack halted. Came a few seconds of silence save for the heavy breathing of tense men. Then a gray horde poured over the parapet. They got a warm reception. It was bayonet and butt—hardly room for pistol work. Carlton and the enemy leader were locked for a moment in a death grip. Then the gray figure broke away, barked an order, hurdled the parapet and was gone. The gray wave faded back into its own trench before we had a chance for a shot at them. But they left prisoners—and casualties—behind. Our own were comparatively light. I could understand how that line held. Carlton had imbued his men with the crusading fire which

consumed his own soul. They could be beaten only by extermination.

Bill reported the action next day. The general agreed with him that this modern Horatius should be rewarded. For the moment the original mission of uncovering the enemy spy system appeared to be forgotten. Carlton received a message of commendation and an invitation to visit headquarters. He arrived, with Bill trotting in his wake. I was waiting for them with orders to conduct him immediately to the general's private quarters. To my surprise the general was not there. Ahern and McCarthy, the two giants of the intelligence section, loafed beside his desk. Ahern invited Carlton to be seated, explaining that the general had stepped out. There was, throughout, an attitude of admiration for a hero about to be rewarded. Then came a change. Quick as lightning the atmosphere became tense. Conway's smile faded. His eyes became pinpoints of steel.

"Captain Carlton," he said, and his voice had the rasp of the hangman's laugh, "I see you have your service pistol with you. While you are waiting for the general I wish you'd look over these notations. I'll be back presently, but you will excuse us for the moment." He nodded to Ahern, McCarthy, and myself to accompany him from the room. Puzzled a bit we followed. The door had scarcely closed behind us when there was the roar of a revolver.

When we reentered, Captain Carlton was lying on the floor. A hole in his forehead told the story. Beside him lay his service pistol and the sheet of memoranda Conway had given him.

Swiftly I read the penciled sentences:

"The messages of your machine gun telegraph":

"Withdrawing troops and artillery five kilometers east for concentration near Ypres."

"Attacking tonight from point two kilometers west over five kilometer front. East depleted four kilometers."

"Attack at once. Urgent."

I gazed at Conway questioningly. His usually boyish face was almost saturnine. He read my question in my eyes.

"Those," he said, "explain why our friend always stopped attacks and why Jerry always hit the right spot at the right time. They also explain Carlton's fondness for personal strafing. The machine gun was his telegraph. He was so sure of being above suspicion that he didn't bother to code his messages—tapped them out in straight Fritzie, which I happen to know pretty well."

"A spy?"

Conway nodded.

"Why didn't you wait and have him shot?"

"Because, spy or not, he was a very brave man, serving his country as only a patriot would. And, further, because he has become a hero to his men and to half the army. To reveal him as a spy would be to raise hell with morale."

"Carlton and the enemy leader were locked for a moment in a death grip."

"How about this?" I asked, nodding at the crumpled figure on the floor. "His suicide will take some explaining."

"You're laboring under a misapprehension," Bill said grimply. "Captain Carlton, officially, at least, was killed by a shell fragment while on his way to headquarters for citation and promotion. Knowing his men, I think they'll exact a heavy toll from the enemy to avenge him."

They did.

To All Members of the National Rifle Association:

IN CONNECTION with the Budget items in which we are vitally interested—National Match and aid to civilian clubs—we must concentrate our efforts upon the following six members of Congress:

Representative Martin B. Madden, of Illinois, Chairman.

Representative Henry E. Barbour, of California, Chairman, Sub-Committee.

Representative L. J. Dickinson, of Iowa.

Representative Frank Clague, of Minnesota.

Representative Ben Johnson, of Kentucky.

Representative Thomas W. Harrison, of Virginia.

The situation is as follows:

Mr. Madden is Chairman of the House Appropriations Comittee. Mr. Barbour is Chairman of the Sub-Committee, made up of himself and the other four gentlemen named. We must prove to these six gentlemen of Congress the absolute need for the National Matches to be held annually, and for the Federal Government to render some assistance to those civilians who are willing to take rifle instruction.

Write your own Senators and Congressmen with respect to this matter and urge them to support these items, but also write the above six members, as by concentrating upon them we will be able to include in the budget as reported out of the committee the items in which we are interested. Your own Senators and Representatives can help materially by assisting in the passage of the bill, but the six members above named are the "key men," as it rests with them whether or not the items will be in the bill when the bill goes to the House for consideration. It is the opinion of the writer that it will be absolutely impossible to add an amendment to the bill on the floor of the House. If we are to secure the financial assistance we need and must have, we must secure it from the committee before the bill is reported to the House. I urge all our members, therefore, to bring pressure to bear, by letter, telegram, or otherwise, upon these six members of the House Appropriations Committee, in the hope that by so doing we will be able to influence them to give us the National Matches and the aid we need for civilan clubs.

Act immediately.

Sincerely yours,

M. A. RECKORD,
Executive Vice-President.

The AMERICAN RIFLEMAN

OFFICIAL PUBLICATION OF THE NATIONAL RIFLE ASSOCIATION, PUBLISHED SEMI-MONTHLY ON THE FIRST AND FIFTEENTH DAYS AT 1108 WOODWARD BUILDING, WASHINGTON, D. C.

LT. COL. F. M. WATERBURY.....*President*
HON. BENEDICT CROWELL.....*First Vice-President*
LT. COL. L. M. RUMSEY.....*Second Vice-President*
BRIG. GEN. M. A. RECKORD.....*Executive Vice-President*
C. B. LISTER.....*Secretary*

JACK ROHAN, Editor.

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Manuscript—The American Rifleman receives from its readers and from rifle enthusiasts a large quantity of valuable material for which no payment is expected. It does not ordinarily purchase unsolicited articles. Manuscript for which payment is expected must be marked "Submitted at usual rates." Manuscript submitted in prize contests should be marked "Submitted for prize contest." All other manuscript will be regarded as submitted gratis. The American Rifleman assumes no responsibility for unsolicited manuscript and can return no manuscript unaccompanied by a self-addressed envelope and ample postage for return.

Headed For The Bow-Wows.

DOWN in Winston-Salem, N. C., it was announced that the ministerial association *"unanimously"* condemned a plan to organize a rifle club in the high school. One pastor promptly struck out the *"unanimous"* by announcing that he left the meeting before the idiotic motion was passed, and that had he been present when it was introduced he would have unburdened his soul on the subject of pacifist asininity.

The action of the reverend gentlemen who so vigorously oppose marksmanship training for the youth of the land harmonizes with the views of those preachers who have been loundly demanding the suppression of firearms practice in general and military training of any sort in particular, and in the next breath complaining that the United States is becoming as decadent as "France under Louis XIV, Italy of the Fifteenth Century, or Pagan Rome."

The general tone of all these statements indicates that while these reverend gntlemen may pose as scholars among ignoramuses they certainly qualify as ignoramuses or fools among students of history and scholars generally. Even if they know no history, casual, common sense observation would teach them that the "sissy boy" who is not only afraid to fight but incapable of putting up a scrap, has a much harder row to hoe around the Little Old Red School House than the youngster who is able and willing to battle for what he regards as fair play. So much for their views on the "psychology of firearms training."

As to the so-called "decadence" of the United States, it is true that the younger generation likes fun, and that its ideas of fun are not the ideas held by its parents and grandparents. It may be that Johnny packs a hip-flask and gives Mamie a little nip when the wind makes the interior of the parked flivver a bit chilly. Dad didn't need the flask. He could pull the old cutter up in front of the hotel and go wrap himself around a Tom-and-Jerry while the lady he was courting cuddled under the buffalo robes outside with her feet against the hot bricks. What other didoes dad may have cut is not a matter of record, because Old Dobbin was no more given to blabbing than is the modern Lizzie. Incidentally, the examples of "decadence" so frequently cited merely add to the evidence that there is a lamentable lack of education among certain of the Celestial press agents.

There was nothing particularly decadent about the gang that trained with the Fourteenth Louis. True, the boys dressed up like Easter eggs, but anybody who started tossing one of them around found the egg was hard boiled. Those be-ribboned babies fought all over Europe, remade its map, and would get up at dawn to cross swords with some gent who had offended them. It takes nerve, not decadence, to tackle cold steel before breakfast. It wasn't until a clock-mender who meant well but who had the pacifist complex, took over the king's job and put an end to the "fighting spirit" that La Belle France slipped and fell down stairs. Its martial backbone *had* become "decadent" by that time.

Those who get their knowledge of the Fifteenth Century from authoritative history and not from the writings of horrified simpletons know that, although the customs and moral codes of that period were not those of our own, there was nothing of the cake-eater about them. They left bookoo footprints on the well-known sands of time. Incidentally, it wasn't "Pagan Rome" that the nomads pulled to pieces. It was the "pacifist Rome" whose prominent citizens figured it was easier to pay than to fight. All of this is mentioned merely in the hope that the Winston-Salem ministers will realize that proficiency in the use of arms is not proof of "decadence" any more than effeminate cake-eating is indicative of unsullied virtue.

It is probably true that some boys and girls go wrong. They did that when Father was a boy, when Granddad was a boy, and when Father Abraham was quite young. But they don't go wrong in rifle clubs, nor on rifle ranges. The youngsters who are interested in firearms are not becoming involved in lover's lane scandales. They are keen eyed and clean, morally and physically.

True, we have plenty of *cake-eaters* and *lounge-lizards*, even as the last generation had *dudes* and *stage-door Johnnies*. But you don't find them in rifle clubs and on rifle ranges. Shooting is a manly game—and he-men are clean morally and physically.

Many red-blooded men of God know this, and are supporting the N.R.A., heart and soul. It is safe to say they outnumber those represented by the Winston-Salem group. Their experience indicates that if the reverend gentlemen who are broadcasting through their chapeaus about the perils of shooting on the one hand and general "decadence" on the other would organize rifle clubs in their Sunday schools and encourage the youth under their jurisdiction to attain skill in rifle marksmanship they wouldn't have to worry about hip-gin and petting parties.

Whether they do or not, however, reports available in the N.R.A. offices indicate that there are enough clean-cut youngsters interested in shooting to keep the U. S. A. from going to the bow-wows within the next twelvemonth, anyhow.

Cooperation

THIS issue of the new and larger AMERICAN RIFLEMAN, and the issues which will follow during 1927, are the result of splendid cooperation on the part of many individuals and companies interested in rifle shooting. It would not have been possible to send THE AMERICAN RIFLEMAN to every member of the National Rifle Association had the advertisers in the magazine not been willing to cooperate as they have in the support of the publication. It would not have been possible for the N.R.A. to have assured these advertisers of sufficient circulation to enlist their support had not the members during the past few years cooperated in the building up of a large, high-quality membership list. Let's all cooperate for future expansion.

"No Freedom for Crooks"

By Jack Rohan

THE city of Baltimore, as most folks know, is in Maryland. 'Tis a seaport with a population of around 800,000, ranking third among the ports of hte United States, with thirty-seven steamship lines bringing the turbulent seafarers of the world to its docks. Along its waterfront you may hear the jargon of many lands and note the tints of many races. Negroes, Lascars, the hybrids of Asia, Africa, and the Mediterranean coast mingle in its byways as the crews from far-faring vessels take a bit of shore leave. In that motley ebb and flow there are knives slung under arms—knives that have bitten men. There are guns, carried in unusual places so as not to advertise their presence.

But, in comparison with other cities of its size and cosmopolitan character, Baltimore has a minimum of major crime. Yet Baltimore is the most liberal spot in the State, and boasts of its status as the "Free State" of the Federal Union. And free it is. The citizen who wants to see the ponies run, and mayhap place a bit of a bet, may do so in Maryland without interference from the police. The thirsty soul who craves a whif of the foam that once brightened every Schuetzenfest in the land may, if he cannot get his brew, find a populace that will concede he should have it. The motorist may carry such armament as he deems necessary to protect his property and have no fear of running afoul of the law, for the Free State statute which prohibits gun-toting to all as a pastime, carefully provides that a citizen may arm himself to protect his life and property.

With such goings-on, the casual observer might suspect that Baltimore would be the haven for the lawless, godless, and whatnots of the underworld. The contrary is true, and the peculiar feature of it is that in the days when the rest of the nation was reasonably "free," Baltimore, as other seaports, was rated a "tough town." It isn't any more. It has a murder now and then—usually the outgrowth of some domestic infelicity among the negro or the alien. It has an occasional holdup. But it hasn't any crime problem such as New York, Chicago, San Francisco, and similar cities are weeping over. The reason appears to be that it has an efficient police department, bossed by Gen. Charles D. Gaither, a man who knows his job and believes his policemen should know their work and be able to handle the tools of their trade.

General Gaither regards the revolver as one of the policeman's tools. And he makes it his business to see that the policeman can handle it. Most of them can, today. Six years ago, when General Gaither took charge of the department, it was a different story. Aside from a few "gun bugs," whose sanity was now and then a matter of doubt in the minds of old-time commanding officers, the police of Baltimore carried revolvers as they wore their badges—the gun was part of the uniform—a symbol of authority—just that and nothing more. It never occurred to the great mass of them that some day skill in its use might spell the difference between snuffing out a desperado and wearing a lily on a wooden overcoat.

There was no standard arm. Inspection was a joke. The first general inspection after General Gaither took charge revealed that the world's prize collection of junk, masquerading as firearms, was in possession of the John Laws of Baltimore. There were old single-action Colt's, so pitted and rusted as

Gen. Charles D. Gaither

to be useless. There were Smith & Wessons of ancient vintage in similar condition. Every cheap, unreliable arm made at home or abroad was represented. Few of the arms would fire, but their possessors didn't know it. They'd never tried to fire them. Some ingenious policemen, finding that the guns had a tendency to drop out of the holsters—which, of course, seldom fit—wound them with cord around barrel, cylinder, and butt in order to keep them from slipping out and getting lost. Others tied them in with wire. Probably less than a hundred of the policemen of that day could have drawn their arms quickly. Not that many would have been able to fire the guns had they been able to draw them. It wasn't the fault of the men, especially. It was characteristic of most police departments, which, commanded by men who cherished the traditions of the two-fisted cop who ruled Bedlam with his hands and night stick, found no encouragement to learn the use of the tool to which crookdom has turned in the last decade —the firearm.

General Gaither, an experienced soldier and a man of sense, shivered a bit when he realized how helpless these policemen were against crooks possessing modern arms and willing to use them. His first move was to arm his men with serviceable weapons. His next was to teach them their use.

He cast about for an instructor. The old-timers weren't able to encourage him much. They'd spent their time walking their posts, handling the roughnecks with fists and clubs and faithfully performing what they regarded as the duties of a police officer. Now and then one of them would meet up with a gunman and get killed. The gunman would escape, usually. You can't beat a gun with fists and clubs. Then one day a young harness cop dropped into the commissioner's office to pay his respects. He parked a Springfield rifle and three or four business-like handguns outside the general's door, but wore his padded coat inside. General Gaither knew what that meant for he had been active in the affairs of the National Rifle Association for years, had handled and trained international teams and had been rated a top-hole rifleman back in the old Krag days. He checked up on the patrolman, who obviously was returning from a rifle range which he had visited on his own time—for his own personal satisfaction.

THE general got a bit of a shock. He learned that the patrolman was one, James C. Downes, a nice lad and faithful, efficient too, but a bit touched in the head—according to moss-grown police standards. It seems that Downes was a "gun-bug." Little by little General Gaither got the story of the lad's eccentric ways. It appeared that when Downes came on the "force" he scorned the "American Bulldog" which was issued to him (before General Gaither's day the Baltimore police were armed with weapons seized from crooks and such in police raids), and equipped himself with one of the best .38-caliber revolvers he could buy. In addition, he bought a cartridge belt and a holster to fit his gun. Then he laid in a secondary battery which could be inconspicuously carried in his coat pocket. That made the hair of the old-timers stand on end. Why a policeman should burden himself with a cartridge belt and a spare gun—and why, above all, he should spend his own money for them—was past their understanding.

But that wasn't all. This Downes lad bought ammunition and spent what time he could spare from a 12-hour tour of duty in target shooting. Also, he cleaned and oiled his arms regularly. It was freely predicted that some day that lad would go and shoot some innocent holdup man and maybe be tried for murder.

General Gaither heard the whole sad story —and made Downes a sergeant. Also he continued his work of supplying his policemen with modern, effective arms. This had to be done gradually, because funds were lacking,

as they usually are lacking in the army and in police departments, but finally General Gaither had the satisfaction of knowing that every man in his department was packing a .38 special. He then turned to the job of teaching them to shoot.

At first there wasn't much enthusiasm. Many of the policemen had been reading bout the prowess of "Wild Bill Hickok," who seems to have been the Paul Bunyan of the shooting game, and had reached the conclusion that a man was either born a dead shot or he wasn't. General Gaither made Sergeant Downes a lieutenant, put him in charge of athletics in general and shooting in particular, and told him to do his stuff. At first the training was on a makeshift range. Later, every station in the city of Baltimore was equipped with a pistol range. Some of them are only 15 yards, accommodating two targets. Others are larger. But every station has a place in which the patrolmen and officers attached to the station can obtain proper pistol practice under competent instruction.

Marksmanship was made the big feature of the police school, in which raw recruits are trained for the work of peace officers. The army qualification course was used as a model and every youngster who came out of the school to walk a beat, drive a flivver, or ride a motorcycle was required to qualify at least as a marksman before he went on the job. Lining up the old timers was not quiet so easy. But General Gaither put it over. He issued an order that every man in the department should qualify at least once a year and made plain that those who didn't stood an excellent chance of going to the tall timber if they didn't get bumped off the force entirely.

There was a sudden epidemic of practice. Old timers who never had fired a shot in all the years they had packed rusty guns—nor since they had received the new ones—but who felt confident they were "born shots"—stepped to the firing point nonchalently (just to humor the boss) and started their strings. They sprayed lead over the ceiling, against the walls, against the floor—everywhere except on the target.

They were surprised, but not stampeded. They cussed the new guns and allowed as how these just wouldn't shoot straight. Lieutenant Downes and some of the men he'd trained in school soon convinced them it wasn't the gun. The old timers found they needed instruction before they could "humor the boss" to any appreciable extent. They got it. They were taught to hold and sight. They were taught to press the trigger, keeping their eyes on the target the while, instead of jerking the trigger, shutting their eyes, and waiting for the explosion to come. They were, in short, taught to hit something, firing slow fire. Then they were educated a bit in the tricks of rapid fire.

But that was only a start. There were two other vital problems. One was to replace the "fist and stick" complex of the old timers woth the "shoot when necessary" complex; the other was to keep the enthusiasm of the shooting youngsters within reasonable bounds. This was accomplishd by training. General Gaither and his instructor are well aware that it isn't the policeman who is an expert marksman who gets himself killed or who shoots needlessly. They do realize that the chap with a smattering of marksmanship is apt to hold his fire too long, from a misplaced confidence in his own prowess, or to open fire too soon, just to prove that he's willing to shoot. The Maryland law, of course, puts a curb on these latter gentry, because a coroner's jury verdict is required in Maryland to exonerate a policeman who kills a man in line of duty. But General Gaither hasn't a high opinion of this law and prefers to so train his men that coolness, self-confidence, and in a crisis, deadly skill will protect the public from crooks, and the policemen both from the bandit bullet and the possibly unfriendly coroner's jury.

This is being developed on the pistol range in every station. The men learn not only how to shoot but when. They must know both because of that before-mentioned Maryland law which makes it possible for a hostile grand jury to "bump" a shooting cop. One such instance occurred. A policeman killed a man in line of duty. The decedent had powerful friends. The policeman was indicted, convicted, and sent to the penitentiary. If the police hadn't been able to convince the governor that the killing was not only justified but provoked, the policeman would be there yet. As it was he was pardoned.

Construction is progressing on modern range for Baltimore police

AS SOON as all of his policemen had learned enough about firearms to enable them to improve their skill without the presence of an instructor, General Gaither proceeded to organize a regular system of training. Here he bumped into a snag—money for ammunition. He finally got the ammunition, but exactly how only General Gaither knows, and he isn't telling. At all events he managed to complete qualification of the entire department—at least to the extent of keeping them all on a silhouette target. Then he reduced the thing to a system. The four summer months are the mandatory training months. Every policeman on the force must, through these months, fire at least ten shots a week. And before the end of the period he must qualify.

Recently General Gaither moved his headquarters and his headquarters departments into a fine new police building. In the basement of this, and adjoining the garage which houses the patrol wagons, motorcycles, flivvers, and the like, he has under construction what probably will be the best-equipped indoor police range in the country. Brilliantly lighted, so located as to prevent the noise of the firing reaching other parts of the building, this gallery makes ranges up to 35 yards available. Deflectors of steel, strong enough to stop the .45 caliber service bullet, protect the lights and heating apparatus. There is a backstop of similar steel set at such an angle that rebounds and richochets are virtually impossible—certainly improbable.

Four targets—operated from firing point to butt by a gang-carriage—are available, and at firing point there is a fine oak cleaning table, completely equipped with drawers and recesses for the necessary cleaning tools. The completion of this range will give Baltimore a system of police ranges that probably will be the best in the country. And Baltimore isn't bothered much with the gangs and stickups that infest other towns. The word has gone abroad that General Gaither has taught his

men to shoot and that he's making them keep in practice.

I asked General Gaither if he felt that the shooting training of his men was responsible for the slump in the crime business in the "City of the White Front Steps."

"It all helps," he explained. "Crooks hesitate before they mix it with policemen who are known to be good shots. The point is that a revolver is one of the tools of the policeman. He may never have to use it. But he certainly should know how. The way some policemen shoot, the only man reasonably safe is the man they are shooting at. But it's not so pleasant for the innocent bystander."

General Gaither then revealed one result of Baltimore's marksmanship training for police. Recalling that in the old days if a policeman went into a waterfront "joint" his chances of stopping a bullet were exceedingly good, he revealed how the thing works out today.

"We don't bother the decent citizen who carries a gun," he explained. "If a reputable man is arrested ıor speeding and has a pistol in his car, he is, of course, charged with carrying concealed weapons, an offense which carries a sentence of a year in the house of correction. The magistrate takes his word that he was carrying the arm to protect his property—which he is entitled to do under the law. The gun charge is quashed and the man is fined for speeding. But when we get a crook or a tough, known to have no property worth defending, we just send him up for a year. Then at intervals the police raid all the hangouts of the tough element. Because these know our men are trained to shoot there never is any trouble. The officers go in, search the crowd, and chase them on their way. They never catch anybody with a gun in his pocket—or a dangerous knife. But usually after the place is cleaned out they gather up a couple of bushels of knives, brass knuckles, Spanish guns, and the like. They never meet nay resistance in these raids."

The Maryland firearms law seems to work perfectly under the police administration of General Gaither. Decent citizens are armed. The others don't keep their arms long after they get them.

Then, of course, there is another angle which General Gaither brought out. While *Liberty* moves around without handcuffs or legirons in the Free State, *License* is more or less out of luck because *Justice* travels in a speed-car and not in an ancient ox-cart. The only freedom allowed crooks in the leading city of the Free State is the free ride to the penitentiary, and such freedom as the inside of that institution affords thereafter. There also is freedom of the gallows and freedom of the whipping post under certain circumstances. It will be recalled that, although New York State couldn't hang the "Candy Kid," the Free State could and did, in spite of the tears which maudlin sentimentalists shed on the shoulders of the Free State's chief, Governor Ritchie. Then, some few weeks ago a young cake eater, laying the foundation of a famous career as a stickup man, held up and robbed a store. The Baltimore police had him twenty minutes later. 'Twas Saturday night, and he rested in the hoosegow over Sunday. Monday the grand jury indicted him. By Tuesday night he was in the penitentiary for a sojourn of twenty years.

I checked up a list of twenty cases—robbery, assault, theft, and the like. The average time between capture and entrance to the penitentiary was less than a week.

Then it occurred to me to compare the gun-play of the present Baltimore department with that of the olden days. This was not easy, for the records are not readily available.

I found that it was not uncommon for a bad man to take a shot at a policeman in those days. I found, too, that on the rare occasions when the policeman had a gun that would shoot and returned the bad man's fire, most of the lead was sprayed over the landscape. There seems to be no record of casualties among the bad men.

In the last two years the casualties have been the other way around. The only real "massacre" of policemen was consummated by an insane man operating a rifle. He killed three policemen and wounded three more. But—one of the wounded men, shooting from the ground, killed the maniac.

Two holdups tried to escape recently. One ran one way, another the other. A policeman corralled one on a porch.

"Drop that or I'll drill you," the officer ordered.

The robber complied. The policeman, walking a safe six paces in the rear, marched his captive toward a patrol box. Suddenly the robber broke and ran, in the meantime attempting to draw an extra revolver carried in his left hip pocket. The officer promptly shot him. There was no wild firing, no erratic "running duel." A cop who had been properly trained in marksmanship fired once. Item—one holdup man less.

All of which would seem to indicate that, while the decent citizen can enjoy himself "free and frequent," in Baltimore, Md., General Gaither's policy makes freedom scarce for crooks in the "Free State."

National Guard Backs N. R. A.

By Robert Derr

DECLARING that the "National Rifle Association is doing a splendid and patriotic work," the 1926 convention of the National Guard Association of the United States, held at Louisville, Ky., Nov. 17, 18, and 19, passed resolutions indorsing the work of the N.R.A., urging members of the National Guard to cooperate in every way with the N.R.A., directed its officers to urge upon the War Department the necessity for holding the National Matches annually, and contributed five hundred dollars to the fund for the support of the International Team.

MAJ.-GEN. W. G. PRICE, Jr.

The resolutions follow:

Resolved: This association is vitally interested in the promotion of rifle practice. To this end it is believed the National Matches should be held annually, and that the United States should participate in the International matches. Be it further

Resolved: That the officers of this Association are hereby authorized and directed to make every effort to have the War Department change its present policy upon the National matches and to approve the holding of these matches annually, and that the sum of five hundred dollars from the treasury of this association be subscribed and paid to the National Rifle Association for the purpose of assisting in defraying the expenses of the International Team, which should be trained and sent to Rome to compete in the International matches in the spring of 1927.

COL. G. A. FRASER

Whereas, the present plan of military defense of this nation places heavy dependence upon the civilian population in time of emergency, and

Whereas, the promotion of rifle practice, particularly among the schools, colleges and civilians of this nation, is a most important step in the training of the citizens for the defense of the nation, and

Whereas, the National Rifle Association, with its fifteen hundred clubs and twenty thousand members, is doing a splendid and patriotic work; be it

Resolved, That we heartily indorse the work of the National Rifle Association and urge our members to cooperate in every way in the furtherance of this work.

The spirit expressed in the resolutions was reflected in the general tone of the convention's activities, which stressed the importance of the civilian in the national defense scheme. It also found an echo at the meeting of the adjutants general of the United States, at which Adj.-Gen. F. D. Beary, of Pennsylvania, appointed a special committee, with Adj.-Gen. G. A. Fraser of North Dakota as chairman, to urge upon the War Department a more generous provision for the National Guard's training in marksmanship. General Beary, in discussing the reasons for appointing the committee made it plain that the adjutants general favor ample appropriations.

"I believe," he said, "that if the question of money to carry on the 1927 matches is

(*Continued on page* 39)

A .22 Adapter for Service .45 Automatic

By Dr. R. D. Paul

BEFORE shooting the .45 Automatic became a genuine comfort or pleasure and before the writer learned to reload shells for about seventy-five cents a hundred instead of the almost prohibitive cost of factory-loaded ammunition there was felt a need for some sort of subcaliber training adapter. It was this that prompted the development of a .22 adapter barrel. It served its purpose admirably during the inititon period and since then has been an interesting novelty for shooting where conditions were not favorable for the heavier cartridge and in addition has made unnecessary having an extra gun for small game and pests and any other minor short-range hunting. Some inquiries have been made about the production of such an adapter and thus the writer submits in as great detail as space will permit an account of how anyone of fair mechnical ability may construct such an adapter with a minimum of tools. Any high-class mechanic will please pardon what may appear unnecesary detail.

To begin with, the type of barrel found most satisfactory and herein described was not produced at first and quite a number were made before the best type was evolved. The reader need not be troubled with this except to say that the first ones were made with the bore above the barrel axis and empties had to be punched out. Some were chambered so the bullets were seated by pressure or the slide released on them and they sometimes exploded in seating. One had no countersinking for the shell head, and closing the slide would frequently fire the shell. The final barrel is one having the general outside appearance of the .45 barrel, but with the bore to the right of the barrel axis so the firing pin will strike the side of the .22 cartridge and so the extractor will eject the empty shell when the slide is opened for reloading. It necessarily makes a single-shot gun. (See cut 8, showing an end view of breech of finished barrel.)

All experimental adapters were made from pieces of heavy .22-rifle barrel thick enough to permit of cutting away one side and still leaving enough metal for an adapter of .45 barrel outside dimensions, but with a .22 bore off center. A photograph of adapters and parts and some drawings of various stages of construction will be submitted and if space will allow of their printing, they will indicate to the mechanically inclined more than may be indicated by these pages of description.

Tools required should be a lathe suitable for work on centers and with preferably both a universal and independent jaw chuck, plenty of flat, round, and semi-round files, small drills, vise, soldering outfit. A micrometer caliper is almost necessary. Materials required should be a piece of heavy .22 barrel at least thirteen-sixteenths inch in diameter and at least seven and a half inches long, a small piece of round cold-rolled or medium-hard steel, half-inch or more in diameter, for plugs and a small piece of flat three-eighths-inch cold-rolled steel for the lug on the under side. For barrel stock, discarded Stevens 414 rifle barrels were used, but any other thick barrel would be satisfactory. If more than one adapter is desired, use five and a half inches extra for each one. Do not plan to turn more than three in one operation, and plan to make each five and three-eighths inches long to allow for an extra sight on the end if desired.

To turn an adapter from a piece of heavy stock barrel, it must be placed off center in the lathe, and to do this the bore must first be plugged at both ends and lathe center holes made at proper points in the large ends of the plugs. Great care is necessary that the lathe center holes be so bored as to center at the edge of the bore of the stock barrel and that the plugs be inserted (as shown by cut 4), so the lathe center holes are both on the same side of the bore, and so a line joining the two would be exactly parallel with the axis of the bore. To aid in this necessary precision it was found best to first put the stock in the lathe with the points in the bore and then scatch a line from end to end with the lathe tools. (See cut No. 3.) Make the plugs to just tightly fit the bore and smooth off the large head. Then cut in the center a bore-diameter circle on the face of the head and scratch a line across the head through the center of the circle. Where the line cuts the circle will be the point to make the lathe center hole (as illustrated by cut No. 2), and where it comes to the edge of the plug head on the same side will be the point to line up with the scratch on the stock barrel in inserting the plugs. Solder the plugs to proper places to prevent slipping during machining. Lathe center holes should be started with a very small drill and enlarged with a sixty-degree reamer for the lathe points. (Cut No. 4 shows barrel ready to begin turning.) The stock is now ready for the lathe and may be turned down and polished to 690/1,000 inch, or the diameter of the breech end of the barrel, as shown in cut No. 5. One and fifteen-sixteenths inches of this size must be left clear for the breech end of each barrel under construction, but it is better to allow some extra for cutting and trimming. The balance of nearly three and a half inches of stock marked in its proper place for each barrel may now be turned down to 580/1,000 inch for the muzzle portion of the barrel or barrels. (See Cut No. 7.) I would emphasize the importance of close measurement in this so the barrel bushing will later fit tightly but move freely. In this and all later operations it is highly desirable to have a .45 barrel on hand for comparison and measure.

The locking grooves on top of the barel are three-sixteenths inch wide and leave locking ribs in front of each groove substantially one-eighth inch wide. (See cut No. 6.) To machine-cut these grooves the breech end of the adapter is so placed in the independent chuck that the final cut will half-circle the adapter and the depth of the groove at the center be approximately even with the line of the muzzle portion—55/1,000 inch deep. Extreme accuracy is not so vital as to depth and in three adapters these grooves were satisfactorily cut with a file. It is probably best not to face-cut the ends of the adapter until the grooves are cut.

The next operation advised is chambering the barrel, and if a chambering tool or reamer is available the operation is simple, but the writer worked down a quarter-inch straight reamer with coarse and fine oil stones to 234/-1,000 inch and tapered the tip to bevel the lands. While not ideal, it worked satisfactorily and was worked by hand by putting it in an ordinary straight drill chuck. To countersink for the shell head, a piece of chamber-sized rod was bored through five-eights of an inch from the end, a piece of untempered drill driven through the hole the ends of the drill filed off and each end sharpened to a cutting edge. When this was retempered, it did a neat countersinking job. The operation can be done on the lathe.

It will be noted that the extreme breech end of the .45 barrel does not house the basal eighth-inch of the .45 shell except at the top, but it must do so with the .22 and to permit the breech end of the adapter to enter the interstice in the rear of the slide it has to be filed off at each side. On the right it should be filed so there is a thirty-second inch of stock left to the right of the chamber. This is beveled at the margin and for a short distance below so the extractor will slide up on this portion to hook over the shell head and may slide down as the rear end of the barrel rises to engage the locking ribs. The left of the interstice in the rear of the slide is narrower at the top than at the bottom so the shell head is pushed to the right to engage the extractor more tightly as the barrel rises in the locking grooves. The rear of the adapter should be made as wide as will permit it to rise easily and prevent side movement of the breech end. It should be cut away a little at the top as illustrated in one of the drawings so it will not impinge on the narrower part of the interstice in entering. See drawings No. 9.

THE link block or lug on the under side of the adapter must be made separately, and can be cut from a piece of three-eigths inch cold-rolled steel. It must be sawed and filed to shape, and since the link slot must be deep, it has to be bored through and filed out. Dimensions are best taken from that on the .45 barrel. The base may be flat or concave, but the latter is recommended with a concavity to fit the curve of the adapter, and is made with a curved surface file. (See drawings No. 10.) In placing it on the adapter the

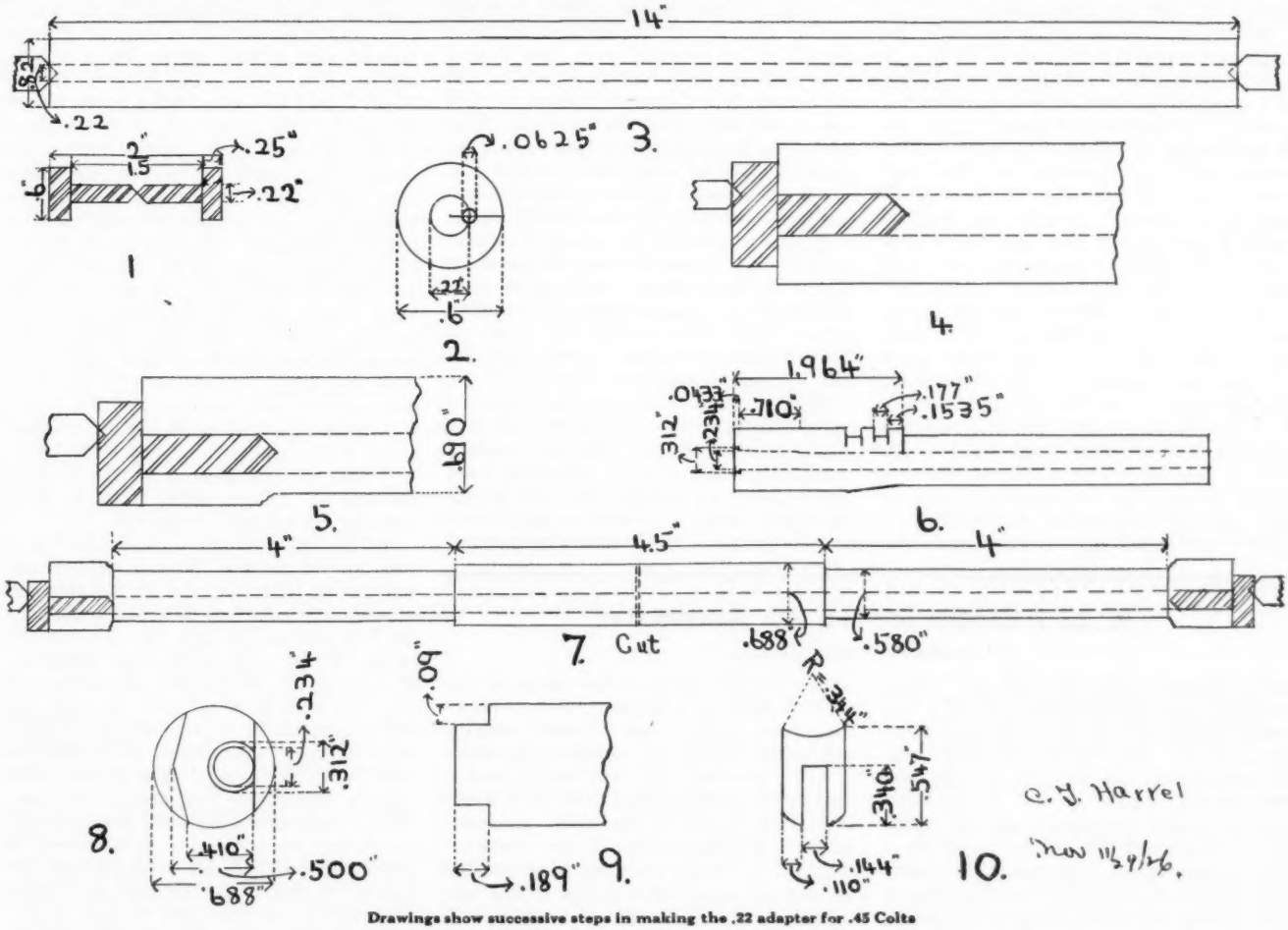
proper distance can be measured from the breech end (14/32 inch), and to insure getting it squarely on the under side, put the barrel in the slide, put the lug in place, and scratch guide lines. To retain, use half-and-half solder by tinning both surfaces first and then, if possible, use a blow-pipe. It could be brazed, of course, but even plain tin has been used, and holds. To bore the link-pin hole it is difficult to tell how best to get it accurately placed, except that it should be centered 21/32 inch from the breech end of the barrel and 27/32 below the top. The link measurements can be taken from the standard link, or it can be made as long as will permit the action to close and thus get the base of the adapter as high as possible. The forward five-eights of an inch of the under half of the larger or basal portion should

If all parts are accurately made the adapter will now fit exactly as the regular barrel and the slide will close to its proper position. If it does not close far enough, the link-pin hole may be bored too low or the link be too long, or both, and a shorter link be required. Again, if the barel rises fully without crowding the top of the slide and it still does not close fully, the lug may be placed too far forward or the slide-stop may not swing freely past the lower part of the lug, or the points on the lower back part may not permit the slide-stop to slip back far enough. The reverse of this latter may be the case if the slide closes past its proper position, or the lug may be placed too far back. In such cases the lug can be changed in position or the depression in front of the points can be filed deeper as indicated. Some minor fitting is

size of the liner. It could not be larger, however, because of the thinness of the adapter near one side of the muzzle.

In testing out the finished barrel, it will probably be found to shoot high, as the .45 normally shoots high unless the rear sight has been cut down, but it may fail on account of minor imperfections in workmanship to center or group perfectly with the coresponding .45 barrel. Some suggestions might be helpful in adjusting this. The grouping may be lowered by using as long a link as will permit the action to close, or a sight may be soldered to the projecting three-eights inch after a spare barrel bushing has been put on and this sight left high enough so it can be seen above the regular sight.

Slight lateral variations can be corrected in like manner by making this new sight a little



Drawings show successive steps in making the .22 adapter for .45 Colts

now be beveled off with file or grinder, as on the .45 barrel.

Caring for the muzzle end is important after it has been faced with the lathe. If proper stones are available for carefully counter-sinking the muzzle and very evenly grinding off the ends of the lands, this is preferable, but in the writer's series, facing and polishing was first done and then all small burrs were carefully trimmed from bore and lands with a small knife and the aid of a magnifying glass.

likely to be necessary. If the rear end of the adapter does not rise as high as possible, the link is too short.

Heavy barrel stock may be hard to obtain, and there could be no objection to boring a five-sixteenths-inch hole through a piece of Ford axle or other steel bar, inserting and soldering in a piece of rifled liner and then proceeding as with the heavy barrel. Such a lining might even be carefully turned down from any other piece of rifle barrel, but great care would be necessary, because of the small

extra wide to be seen also on one side of the regular sight in addition to above it if necessary. Low grouping can be corrected by shortening the link, but will not likely be necessary. Left grouping can be largely corrected by filing off a little more of the basal eight inch of the adapter where it slips into the slot or interstice in the receiver, and the pressure of the extractor spring will crowd the base of the adapter to the left; care should be taken in this, however, or the firing pin will

(*Continued on page* 14)

Speeding Up Handloading

By Laurence J Hathaway

THE operation of handloading can be resolved into three more or less separate and distinct phases. First comes the ballistic or experimental phase, wherein are determined the proper combination of primer, powder, and bullet to produce ammunition suited to the special requirements of the individual shooter, and of the particular gun to be used.

Next comes the mechanical phase, which embraces the intelligent and skillful use of the tool equipment available, to the end that the assembled cartridges may realize, as fully as circumstances will allow, the potential possibilities of which they are capable.

And the third phase of handloading might be termed the production phase. It has to do with accurately assembling the components of a previously determined load as rapidly as possible. It includes the second phase; for in handloading, the product of speed without accuracy is always worthless, and often positively dangerous. In what follows will be considered some of the tools and methods which I have adopted after study and experiment in the quest of speed-with-accuracy in handloading rifle and revolver ammunition.

For, although in first starting out in the handloading game, the idea of speed should not be permitted to enter one's mind, after you have once decided upon the various loads you are going to use for your week in and week out shooting, and have mastered the technique of the process, you will probably find, if your spare time is limited, that the appeal reloading has for you will be more or less inversely proportional to the time it takes to put up safe and accurate ammunition.

I never shall forget with what fascination I first began the study, and then the practice, of making up, at home and with my own hands, real ammunition for a real rifle! The whole thing had—and still has—an indescribable charm; heightened, if possible, by the thought that the cartridges which I was putting up were of reduced power—safe to use in a region where the full load would have been dangerous; and with even the lead bullets of my own manufacture! For it is vastly more interesting to me to shoot a real rifle with reduced loads, than to play around with a pea-shooter.

I began my handloading with the best tool then on the market. It was a multi-caliber tool of the "nutcracker" type; and I used it on both rifle and revolver cartridges. It was beautifully and accurately made, but had three faults inherent in the nutcracker principle. One is that cartridge cases with a tapered body are not truly and accurately supported and guided. Another is that with certain revolver cartridges it is very difficult accurately to seat the bullets in the case mouths. Its third fault is that it is slow in operation. But for a light, handy tool, easy to carry around and use in your lap, as when camping, or for a flying week-end trip back to the old farm, it can't be beaten. I still have this tool, and prize it highly.

Had it not been for its third fault this tool might have done duty indefinitely; for with skillful handling it can turn out beautiful ammunition. But as time passedand spare time became very limited, the strong reloading appeal began to receive a decided setback every time I got out the nutcracker, and slowly and laboriously performed the various loading operations with it. Of course the whole point of view here is governed by the amount of time you can or wish to give to the purely routine and monotonous operation of manipulating the tools. So I set out to discover more efficient methods. I do not happen to be in any way interested in any loading tool concern; and judge tools solely on their merits, as I see them.

THE first operation performed upon a fired case is decapping; and by all odds the most convenient and fastest way of doing this that I have yet discovered is by means of a plain steel rod with a piece of a small finishing nail, or brad, driven into a hole in one end of it. This punch is held either in a vise or in a hole bored for it in the top of the bench. To the left of the punch place the box of empty shells. Beside this box set another box, empty, to receive the shells after decapping. Cigar boxes are fine for handloading. Get a piece of wood about a foot long and about two inches square. Round off the corners at one end for a handle. Then just grab up each empty case with your left hand; drop it over the decapping punch, being sure pin enters flash hole, and hit it one lick on the head with the stick of wood. Lift it off the punch; drop it into the empty box; grab another shell, and so on. The speed with which you can go through a hundred shells in this way is a joy to one's heart! You have to remember to hit the head of the case on a slight angle, so as to leave room for hte primer to come out.

And for real speed use a punch which is as large as can go into the case mouths and just not be tight. A close fit like this will automatically guide the little pin srtight into the flash hole as you drop the case over the punch. In this, as in all the other operations of handloading, the greater the number of cases you work on at one time, the more you will accomplish in a given length of time. Have as many empty cases as possible on hand before beginning. Then perform each separate operation in turn upon all the cases. This, of course, is self-evident when a single tool is used for performing all operations, in which case each separate operation calls for a change in dies, plugs, chambers, etc. But a handloader is apt, from time to time, to pick up or make special pieces of equipment, so that eventually he may be able to perform each and every operation of handloading on a sparate tool. And once his tool equipment is "set up" for any particular cartridge, it will not have to be changed so long as only that cartridge is being loaded. This makes a very satisfactory arrangement; and it need not cost a great deal if you keep your eyes open for god second-hand bargains. With such an outfit you can carry a single empty case right on through to the finished cartridge without having to change a thing;

A .22 Adapter for the .45 Automatic

(*Continued from Page 13*)

strike too far in from the shell rim. Major variations can be corrected by making a new barrel bushing with the barrel opening off center as desired. This requires that the cylindrical portion that fits the slide be thin, and then the end with the aperture for the barrel may be soldered or brazed to one side of the of the center and still permit the barrel to slip through without impinging. The muzzle may thus be set over about one thirty-second inch without materially affecting the breech fit. Carefully measured accurate preliminary work eliminates nea-ly all this later fitting, however.

Just a word as to use and accuracy. Loading is probably done quickest and easiest by slipping the left thumb through the trigger guard from the left side and then with the index finger above and the middle finger below the top of the barrel on the slide end, a slight squeeze opens the action, ejects the shell, and retains for reloading with the right hand. A lighter recoil spring, made easily from a piece of piano wire, lightens the reloading process and puts less strain on the barrel bushing if it happens to be a homemade plain soldered one. A new extractor with lighter spring, more gradual slope where it strikes the shell edge, and with a hook a little farther back for the .22 shell head works a little better, but is not stricly necessary. Accuracy depends on close fit and workmanship, but the writer has made some ten-shot one and five-eights-inches groups at fifty feet by using a hand rest. Mr. C. G. Harrel has done better than this and one adapter he took with him to Sea Girt this summer is said to have behaved very creditably in the hands of some shooters there.

If any credit is due in the interesting experiments on these adapters, the writer wishes to share equally with Mr. C. G. Harrel, instructor for some years at the University of Chicago Pistol and Rifle Range. He furnished the lathe, all heavy barrel stock, all drawings published, and contributed equally in interest, suggestions, and work.

which is a great advantage in special or experimental work. Except for certain special types of tools which perform several operations on a case all at one time, this is the fastest and most convenient system there is, and one to appeal to any handloader whose allotment of spare time is all too limited.

FOR recapping I have never seen anything in small tools which can compare with the little arbor-press recapper supplied with the Government reloading sets. I bought one second-hand and in perfect condition, for fifty cents. It is worth ten dollars! In using it you set the primers, right side up, on the little pan at the left. As your left hand slides an empty case into the slotted bushing, your right forefinger slides a primer over onto the primer pocket. A slight pull on the lever, and that case is primed. Recapping in this way is almost as fast as decapping with the punch. These two operations can, in this case, be combined into one very fast and almost continuous one. The saving in time here is due to handling the cases once instead of twice. In operation the decapping punch and boxes are set up as before. A convenient distance to the right the recapper is fastened to the bench. You decap exactly as before; and as you take the case from the punch you slide it into the recapper, at the same time laying down the stick of wood and reaching for a primer with your finger.

Next to the Government recapper I like the Belding & Mull tool best. Beside its other attributes it is a combination de- and recapper, both operations being performed at one placing of the case in the tool. I do not like the decapping arrangement quite as well as the plain punch; nor the recapper as well as the Government tool. Were I to adopt this tool for recapping I believe I should still decap with the plain punch, and combine the two operations as when using the Government recapper. But for performing all operations in the one tool the B. & M. is very hard to beat. Its fast and convenient neck resizing feature is what brought it into the Hathaway home. And were Belding & Mull to attach the decapping punch to the shell neck expanding plug they woud have a tool which, in one simple and fast operation, would render a freshly fired case ready for the powder measure. The tight-fitting expander plug would guide the decapping pin straight into the flash hole every time.

In handling the little primers much time can be saved by pouring them into the cover of a fair-sized cardboard box,—the cover of a shoe box, for example. Some of the primers will naturally fall right side up; but most of them will not. Pick up the ones that fell right. Then give the box cover a quick little shake sideways, and some of the remaining primers will roll over. Pick these up, and repeat, etc.

For resizing the necks of cases, as stated above, I use the Belding & Mull tool. It would be difficult to imagine a faster and more convenient device for this purpose.

I find I get the greatest efficiency by fastening the tool to the bench at an angle of about forty-five degrees to the left, instead of pointing straight back. In resizing the necks of cases in this, as in any other tool, a certain amount of lubrication is required. But it is important not to use much oil, lest some of it find its way in with the powder. To provide this adequate but not excessive lubrication I use a small tin salve box, in the bottom of which are two or three thicknesses of blotting paper. This blotting paper is saturated with oil; and the salve box placed at the left of the tool, between the latter and the two cigar boxes, one empty; the other containing the empty cases. On the way from the box to the tool the mouth of the case is pressed in to the oil-soaked blotting paper in the salve box. This leaves just a trace of oil at the mouth of the case, both inside and out, which is caught up by the die and plug, keeping everything working smoothly, but with no excess of oil to cause trouble.

THE time to speed up in charging the empty cases with powder is not when you set the powder measure. Once this is attended to—and the setting carefully checked—my method is as follows: I use two loading blocks. The first will hold cases mouth-down only. The holes are too small to admit the heads of the cases. As long as you bring under the powder measure only cases taken, upside down, from this block, you will not be apt to get a double charge of powder into any case. The other loading block takes cases in the upright position. I fill the first block with empty cases, and place it at the left of the powder measure. I place the second block right back of the first. With both blocks at the left you can keep your right hand always on the handle of the powder measure. As you put a charged case into its block at the rear and take one from the other block, raise the handle of the powder measure, performing the two operations simultaneously. Then, as you bring a fresh case toward the measure, start down with the handle, timing the motion so that the case will be surely under the discharge tube before the powder falls. In this way the time ordinarily taken to operate the powder measure is entirely saved.

Though I have not tried it, I believe just about as fast work can be accomplished by those who do not happen to possess a powder measure, but use a scoop instead. The method is to drive two large nails into the top of the bench, about six inches apart, with the nails standing up about four inches or so. Cut a narrow strip of tin and stretch it tight across between the nails, wrapping it around under their heads. Put the box used as a powder container between the nails. Just to the left of this set up a support of heavy wire to carry a small tin funnel several inches above the bench. To the left of the funnel place your loading blocks, as before.

Now: as you reach for an empty shell with your left hand, dip up a scoopful of powder with your right, and strike it level by drawing the scoop under the strip of tin. The empty case is by this time under the funnel, into which you dump the contents of the scoop.

The seating of short bullets for revolvers always gave me a certain amount of trouble until I got a die-and-plunger bullet seater. This is the only real way of seating bullets, any way. I have developed no very speedy methods of using this tool. One thing I have done, however, is to bore a shallow hole in the top of the bench to receive the iron base of the bullet seater. This makes the tool considerably more convenient to use, and and gives some slight increase in speed.

WHEN it comes to the casting of lead bullets, I fear I have little to offer in the way of suggestions for speeding up the work with a single mould. Of course multiple moulds are to be had, but the price is apt to be rather high; and one well-known authority has stated that he considers it quite hard enough to get good conical bullets from a single mould without looking for trouble in the form of a multiple mould.

I have never used one of the latter for conical bullets. Of course, as you gain in practice you will be able to cast much faster with any mould. And I imagine the new nickel moulds are time-and-temper savers, though I have not used one of these, either. Where one is using plain, round balls in reduced loads, the .30 and .45 caliber bronze multiple moulds formerly made at Frankford Arsenal are very fast.

It is no trouble at all to get good bullets from these moulds right along, once you have the hang of it. And the way that .45 caliber mould can walk through twenty pounds of bullet metal would gladden the heart of any busy man! It casts four bullets at a throw, and the .30 caliber casts five. It is my opinion that when a man can afford to do so he will probably wish to buy most of his bullets. However, I believe that every handloader should know how to make good cast bullets, in order to complete his education and increase his independence. And, taken in limited doses, I find bullet casting fascinating work. It strengthens and rounds out that strong and indefinable appeal which handloading has always had for me, and probably always will have.

"Beg Your Pardon"

Through a typographical error in The American Rifleman of December 15, the price of Chloroil, in the advertisement of the Conversion Products Company was printed at 25 cents. The price of Chloroil is 35 cents, and the copy supplied by the Conversion Products Company so stated. The American Rifleman regrets that this error in its mechanical department caused the Conversion Products Co. embarrassment and its customers annoyance.

Editor, The American Rifleman.

Sighting Shots at Shooters' Books

"HANDLOADING AMMUNITION"

(By J. R. Mattern, Small Arms Technical Publishing Co. For sale by AMERICAN RIFLEMAN Book Department. $3.00.)

FOUR years ago Mr. Mattern wrote a series of articles on Handloading Ammunition which were published in the AMERICAN RIFLEMAN. These articles have now been entirely rewritten, revised, and very greatly enlarged, so that there is no sumblance whatever between them and the book which is now before us. This new book is quite an extensive work of some 384 pages and over a hundred illustrations, all of which are original. It is well printed and attractively bound in buckram.

The book deals with the loading and reloading of ammunition for rifles, revolvers, and pistols, and thus it will fill a long-felt need, as it is the first work to appear on that subject alone. Mr. Mattern starts out by telling us of the advantages of reloading one's own ammunition. He shows us how we can get much greater efficiency by fitting all kinds of reloads to our own pet rifle or pistol, loads adapted to it particularly, and not to the smallest bored and chambered weapon of its caliber on the market. He goes very fully into the great economy of handloading, and he not only gives us figures to support his claim, but he actually tells us just where the best and cheapest components of ammunition can be obtained for reloading.

Next he takes up the subject of reloading tools, telling us just what tools we need for efficient reloading of any type of cartridge, and where to get them, and he describes all the reloading tools at present on the market in very great detail. This portion of the book is most excellently illustrated with actual photographs of the various tools, not with the usual trade electrotypes. However, the book is entirely without any commercial basis. He does not recommend any particular tool, but rather tells us what the tool will do, and what has to be done, and leaves his reader to make his own choice. This is as it should be, for the writer has used all of our tools, and he finds each and every one of them good. All will produce fine ammunition if the reloader knows how. This last is the hitch. Heretofore we have not had under one cover a work telling us all about handloading ammunition.

But to get back to the book itself. After the description of the tools there comes detailed instructions for reloading, step by step, starting with the decapping and cleaning of the fired cases, and ending with the seating of the bullet and the marking of the package of cartridges with the data of the load. In this the author goes into the most intimate details. He tells exactly how each step should be done, and explains why it should be done in this way. He tells, for example, how to measure the groove diameter of a rifle or pistol barrel, and how to fit a bullet to that particular size of bore so as to get the maximum accuracy and longest life from the weapon. He tells how to seat a bullet in its case so that when it is fired it will enter the rifling straight and central, and thus fly true when it leaves the muzzle. There are details without number, the book being crammed full of the finest kind of dope, much of it never before suggested to riflemen. It may be said also that all of the information is sound scientifically.

Further on the book gives intimate details and instructions for loading reduced loads, either for economy, for short range target practice, for small-game shooting with the minimum of destruction, or for settled communities. Then it treats with maximum loads of the greatest power and highest velocity, with loads to give the greatest degree of accuracy at short, mid, and long range, and of loads to assure the longest life from the weapon. Next come chapters on reloading each particular cartridge. Here the rifleman will find all the dope for his favorite .30-06 Springfield, his .250-3,000, or his Krag or Russian rifle. All the dope is given for all the popular cartridges, as well as for a lot of obsolete and black powder cartridges, and for many of the foreign cartridges as well. Here the old-timer can learn how to reload his .45-90, or his Sharps rifle for which loaded ammunition is no longer made, and all ammunition on shelves hopelessly stale.

Not the least valuable portion of the book is the splendid and original tables appended. The various tables of weights, measures, alloys, etc., needed for loading are given, and then come the most complete ballistic tables ever printed, and then tables of loads for every cartridge, giving the bullet, the powder to be used, the velocity, the pressure, and the details necessary for the handloader to know relative to that particular load. Any rifleman who has this book need no longer write to an expert to find the particular powder charge for a certain bullet in order to get a certain velocity. He can find it all in these tables in a minute or two. The tables alone seem to us to be worth the price asked for the book.

TOWNSEND WHELEN.

TIGER TRAILS IN SOUTHERN ASIA A REVIEW

(Richard L. Sutton. Published by C. V. Mosby Co. For sale by AMERICAN RIFLEMAN Book Department. $2.50.)

DID you ever sit around a camp fire—or even by the fireplace in your club—and listen to a hunter or traveler who knew his stuff spin yarns on travel and adventure? And if you did, didn't you find that that sort of thing had the travel and adventure book backed off the boards?

The "had" is intentional. It hasn't any more, for Dr. Richard L. Sutton has gone and written a book that does exactly what a good story teller can do—makes one live and feel the adventures recounted. It's called "Tiger Trails in Southern Asia," and while it has plenty of tiger in it, it also gives one a slant at elephants, peacocks, and miscellaneous game. Likewise, it gives one the setting, makes one see and understand the natives, and brings out the shadows of the picture as well as the highlights.

The tiger book follows Doctor Sutton's, "An African Holiday," which, when it appeared, struck this reviewer as the best book of its sort then written. But Doctor Sutton's "Tiger Trails" is even better. It is a straightforward story, told as one might recount one's adventures to a friend, without any straining for literary effect, and without any effort to impress the general public with "what a wonder I am." As happened with Sam Pepys and Ike Walton, Doctor Sutton, writing in simple, honest English, without attempt at literary effect, has produced as fine a bit of literary work as has come off the presses in many a day. It is in striking contrast to alleged hunting and travel stories recently perpetrated on a gullable public by certain "popular" writers.

As you read Doctor Sutton's book you are not wearied with the marvelous skill and courage of the superman of deadly aim and flawless courage. On the contrary you sit in the boma—otherwise a blind—and hold your breath with the "fat man from Missouri," and wonder if Mr. Stripes will show up, and if he does, whether you'll be too excited and nervous to hit him, and also whether, if you do hit him you'll get a pinwheel and down him, or just a "2" and get clawed up.

You sit and wonder with Doctor Sutton whether the lantern under the bullock cart is going to set the straw afire. And you feel your own toe itch as Doctor Sutton applies his boot where it will do the most good in the case of the unreasonable native chauffeur. For there is humor in the book as well as thrill. It's human.

The "gun crank," too, will find some interesting dope on double rifles, as against the high-power small bores, in it. The chap interested in strange lands and stranger peoples will want it on his shelf

The book is not a thick one—it can be given its first reading in a few hours. But it is one of those books one wants to read over and over again. My advice is to get it and keep it. WILBUR COOPER.

* * *

"MAN EATERS OF TSAVO"

(Man Eaters of Tsavo. Lt.-Col. J. H. Patterson. Macmillan. For sale by AMERICAN RIFLEMAN Book Department. $3.50.)

THIS book is not new. It was written many a year ago and has been out of print for some time. The publishers have done a sound service to lovers of real adventure stories by reissuing it. One hopes the sale will be sufficient to encourage them to reissue some of the other excellent volumes which appeal to the outdoor man, but which, unfortunately, are now out of print.

"Man Eaters of Tsavo" is not the conventional tale of a hunter's experiences. Col. Patterson, when he made the acquaintance of the man-eaters wasn't on a hunting trip. He was building a railroad and his laborers

(*Continued on page* 33)

The Vibrations of Rifle Barrels*

By Captain Philip P. Quayle
United States Marine Corps Reserve
Assistant Physicist, United States Bureau of Standards

NEARLY thirty years have elapsed since the work of Cranz and Koch,† who applied an optical method to the old long-barreled Mauser rifles in order to determine their modes of vibration.

To apply to the present American Springfield rifle the conclusions arrived at in regard to these older arms would manifestly be a procedure of very doubtful value. Even if the older results were applicable, the great progress in laboratory equipment witnessed in the last thirty years should of itself be sufficient incentive to apply these modern methods to present-day arms. The high-frequency oscillograph, the rotating high-speed camera and the electron tube are of special value in the measurement of vibrations of this character.

When a rifle is fired the barrel is thrown into vibrations of the three independent kinds possible to any elastic bar, namely, transverse or flexural, longitudinal, and torsional. When

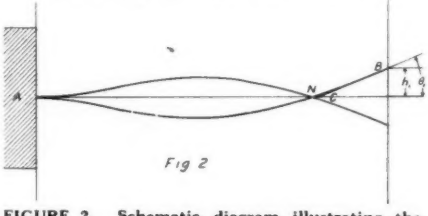


FIGURE 2. Schematic diagram illustrating the second mode of vibration of the same barrel shown in Fig. 1. It will be seen that for an equal linear displacement the muzzle swings thru a much greater angle for this second type of vibration than for that shown in Fig. 1.

the recoil is added to these motions of vibration, the resulting path described by any point of the vibrating barrel becomes very complicated, but it suffices for our purpose to consider the three kinds of vibrations separately, the transverse vibration being the only one of importance.

Longitudinal and Torsional Vibration

Longitudinal waves in a steel bar or a rifle barrel are merely sound waves which travel back and forth, by reflection from the ends, at a speed of nearly 17,000 ft./sec.; and the motion is like that of the air in an organ pipe. Waves moving in opposite directions at the same speed combine so as to set up a stationary wave system with nodes or points of no motion, and antinodes where the longitudinal vibration of the particles of the steel is a maximum. The free end or muzzle is always an antinode; but the amplitude of the motion is very minute and it could, at most, affect only the speed and not the direction of departure of the bullet, so that it seems safe to conclude that longitudinal

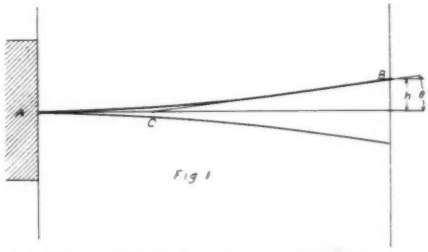


FIGURE 1. Schematic diagram illustrating the lowest or simplest mode of which a vibrating barrel is capable. It is assumed that the receiver, mass of the bolt etc. form a more or less rigid support and this is indicated by the mass A. In this mode of vibration th e barrel simply swings back and forth about some point A.

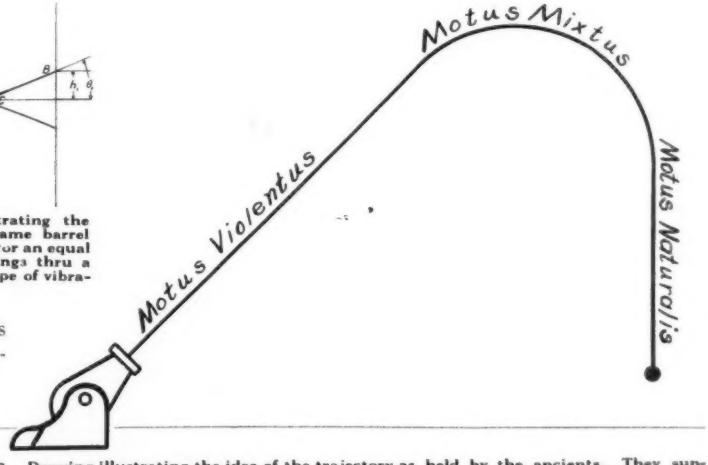


FIGURE 3. Drawing illustrating the idea of the trajectory as held by the ancients. They supposed the trajectory to consist first of a straight or violent portion in which the projectile did not fall under gravity, second a mixed curve of some sort and lastly a natural portion in which the projectile fell straight down.

vibrations never have any appreciable effect on the flight of the bullet.

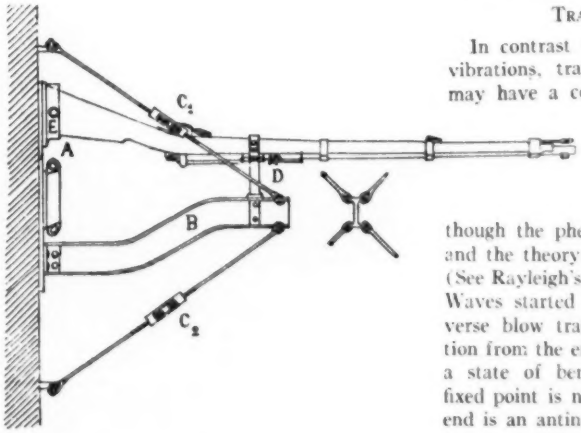
Torsional waves may be started by a suddenly applied torque, as when the bullet takes the rifling. They travel back and forth about 5/8 as fast as longitudinal waves and, like them, set up a stationary wave system with nodes and antinodes. The muzzle is an antinode and twists rapidly back and forth through a very small angle. The effect on the bullet depends on the phase of this rotatory vibration at the instant when the bullet emerges, and it is equivalent to a slight increase or decrease in the pitch of the rifling. The amplitude is very small and it seems most unlikely that there is ever any measurable effect on the trajectory of the bullet, though it is impossible to make any positive statement without further experimental investigations of the torsional vibrations that occur in actual firing.

Unless the bullet strips, the rifling constrains its longitudinal and rotary speeds to remain in a definite ratio so that if one is accelerated, the other is. The bullet is still being accelerated by the powder pressure when it reaches the muzzle; hence, its rotation is also being accelerated and the bullet reacts on the rifling with a torque in the opposite direction. When the bullet leaves the muzzle, this reaction torque vanishes and the barrel is suddenly released from its previous state of torsional strain. This starts a new torsional vibration, but whatever its amplitude, this vibration can not affect the flight of the bullet, which is already gone.

Transverse Vibration

In contrast with longitudinal and torsional vibrations, transverse or bending vibrations may have a considerable effect on the accuracy of shooting so that they are very important.

In a general way, they are analogous to the longitudinal and torsional vibrations, although the phenomena are more complicated and the theory of the subjects more difficult. (See Rayleigh's Theory of Sound, Chap. VIII.) Waves started in a bar or tube by a transverse blow travel back and forth by reflection from the ends, and the bar is thrown into a state of bending vibration in which any fixed point is necessarily a node, while a free end is an antinode.



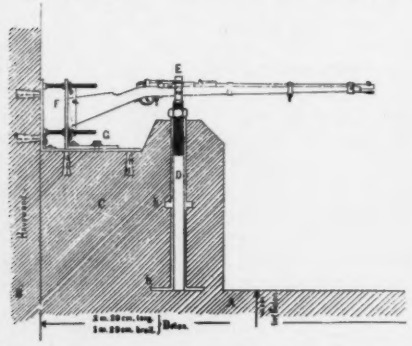
* Published by permission of the Director of the National Bureau of Standards of the U. S. Department of Commerce.

† Abh. d. math-phys. Cl. D. Aked. d. Wiss. Munchen. Vol. 69, 1899, pp. 747-775; also Vol. 73, 1900-2, pp. 559-574.

A rifle barrel, when in place in the stock, acts very much like a steel bar clamped at one end in a vise. Its simplest mode of vibration, which gives the lowest or fundamental frequency, is vibration as a whole with a single node at the breech, as is illustrated in Fig. 1.

A second mode of vibration is also possible, in which there is an additional node at about one-fifth the distance from the muzzle to the breech, and it is illustrated by Fig. 2. This is known as the first overtone and it is between two and three octaves higher than the fundamental.

By striking the barrel at suitable points,



FIGURES 4 and 5. Apparatus used by Cranz and Koch in their experiments on the long barreled Mauser rifle Model 71.

the fundamental and the first overtone may be excited separately; but when the shock is given by firing, the resulting vibration is a combination of the two in which the node of the overtone near the muzzle is at rest relatively to adjacent points, but partakes of the general swing of the fundamental.

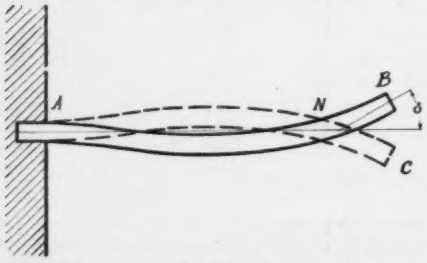


FIGURE 6. Diagram showing the manner in which a rifle barrel bends if clamped at the breach and vibrating in its first overtone.

For a uniform tube clamped at one end, theory shows that the ratio of the frequencies of the first overtone and the fundamental is $n_2/n_1=6.27$. The theory is, of course, not strictly applicable to a tapering rifle barrel which is not absolutely fixed at the breech; but there is approximate agreement with experiment. For example, Cranz and Koch, in their experiments on the M. 71 Mauser rifle, got the values $n_1=27.6$ cycles/sec., $n_2=139$, whence $\frac{n_2}{n_1}=5.0$. The present investigation of the Springfield rifle gave $n_1=61$, $n_2=432$ (roughly), whence $n_2/n_1=7.1$.

The theory also permits of computing the absolute frequencies for a uniform steel tube of known length and diameters, and a similar computation may be made for a rifle barrel by using the average outside diameter, though the length of the vibrating part of the barrel is rather uncertain and close agreement with the observed frequencies is not to be expected. For the fundamental tone, Cranz and Koch computed $n_1=23.2$ cycles/sec. as against 27.6 observed; while for the Springfield rifle used in the present work, the computed value was $n_1 = 47.0$ as compared with 61 observed. The discrepancy is naturally somewhat less for the older and more nearly cylindrical Mauser barrel, than for the short and more tapering modern Springfield barrel.

It might be expected, at first sight, that there would always be a node at the upper band. In the case of the Springfield this is approximately the case, but the experiments of Cranz and Koch on the M. 71 Mauser placed the node of the first overtone some distance from the upper band. In general, the bending strength of the barrel is so much greater than that of the wooden stock, that the constraint by the band is not very effective; for the fundamental vibration occurs in spite of the constraint, and the node of the first overtone may or may not lie at the band, depending upon the circumstances.

Higher overtones, in which the barrel vibrates with 1, 2, 3, etc., additional nodes are possible, and traces of their existence may sometimes be found in the records of the

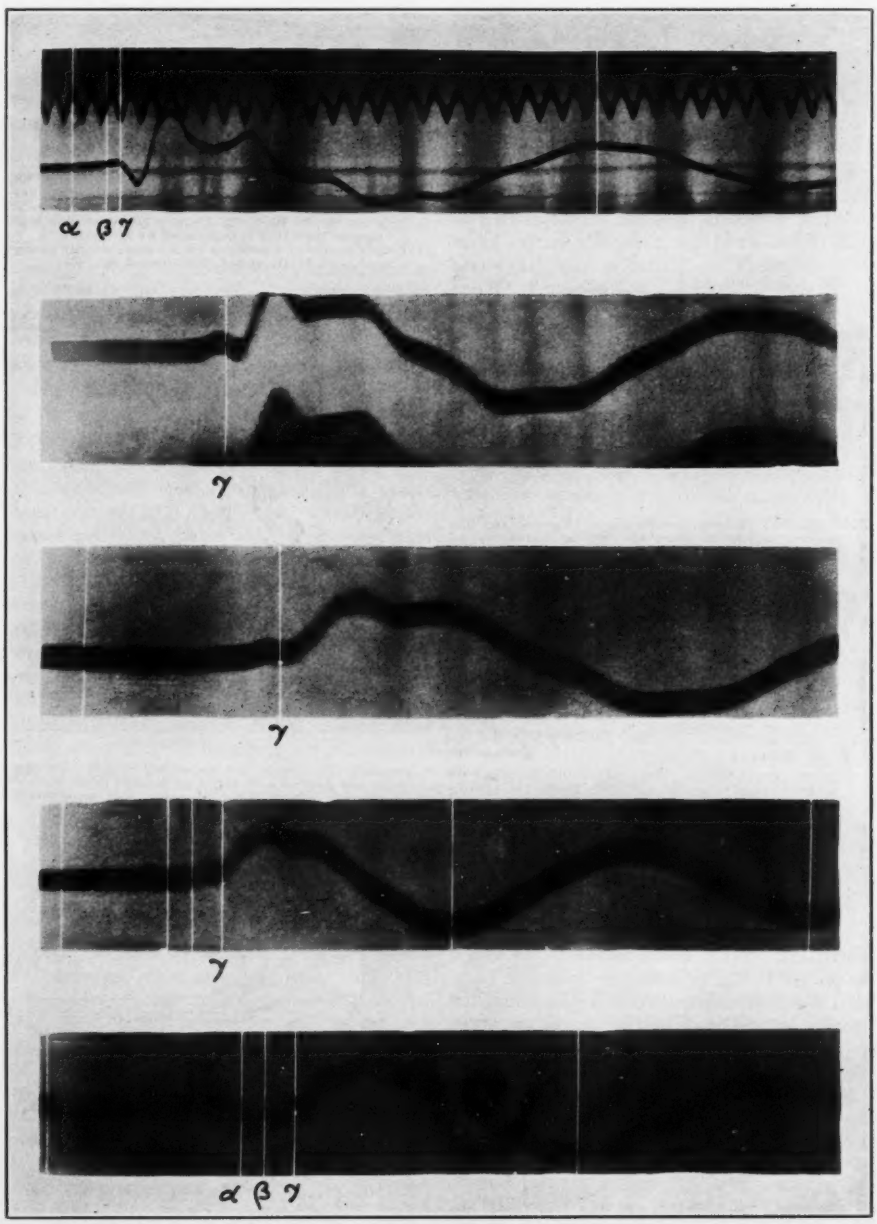


FIGURE 7. Model 71 Mauser by Cranz and Koch. Top to bottom, Vibrations of a point 1.5 cms. from the muzzle. Vibrations of a point 9.7 cms. from the muzzle. Vibrations of a point 14.5 cms. from the muzzle. Vibrations of a point 16.5 cms. from the muzzle. Vibrations of a point 18.5 cms. from the muzzle. In these photographs the interval $\alpha\beta$ represents vibrations due to the falling of the striker and the interval $\beta\gamma$ the vibrations due to the primer and powder. The exit of the projectile occurs at γ.

vibration, which will be described later. But they die out very rapidly and are of such small amplitude that in practice we may ignore them and regard the motion as consisting of the fundamental swing from a fixed point at the breech, with the first overtone superimposed upon it.

Effect of Transverse Vibration of the Barrel on the Exterior Ballistics of Rifles

The vibration of gun barrels was not suspected by early artillerists and apparently gave rise to one of the strangest theories in the history of ballistics. We quote from the British Text Book of Small Arms for 1909:

"It seems to have been the phenomena of the movement of the barrel affecting the flight of the bullet which gave rise to the persistent belief of early artillerists that the first part of the flight of a projectile was in a line absolutely or practically straight; and, apparently in its turn, this belief gave rise to the theory of a 'point blank' range. It was found that when the bore had been carefully aligned on a mark the projectile did not strike below it, even when fired from some little distance. On the assumption that the barrel did not move, it seemed evident that the shot could not be falling during the first part of its flight."

From Sir George Greenhill's "Notes on Dynamics" is reproduced a figure illustrating this old idea of the trajectory (Fig. 3). The trajectory was supposed to be divisible into a "violent portion" in which the projectile did not fall appreciably under gravity; second a mixed or confused curved portion; and finally a "natural portion" in which the projectile fell straight down.

In general, the transverse vibrations set up when a rifle is fired will not be wholly vertical nor wholly horizontal; but for simplicity we may consider the motion as resolved into its vertical and horizontal components and treat them separately. One causes vertical and the other horizontal deviations of the line of departure fo the projectile from its expected direction, but the reasoning is the same for both.

At the instant when the bullet leaves the muzzle, the axis of the vibrating barrel will, in general, make some small angle θ, Fig. 1, with its direction before firing, and we may call this error in the line of departure the bending error. In addition to this, the transverse velocity of the muzzle at the instant of departure is added to the velocity of the bullet along the bore, so that the bullet departs at a small angle φ from the direction of the bore at the muzzle. We may call this the swing error: it is by no means always negligible in comparison with the bending error, though usually small.

If the bullet leaves when the muzzle is at one end of its swing, the bending error θ is a maximum, in one direction or the other, but the swing error φ is zero. If the bullet leaves at the middle of a swing, the barrel is straight and the bending error is zero, but the swing error has its maximum value in one direction or the other. If the bullet leaves at any other stage of the vibration, it is affected by both errors, but neither is at its maximum, and since all the angles are small, the total angular error δ of the line of departure is simply the algebraic sum of the two separate errors and we have

$$\delta = \theta + \varphi \qquad (1)$$

Since small elastic vibrations are isochronous, the transverse speed of the muzzle at the center of its swing is proportional to the amplitude of the swing, and for a given muzzle velocity of the bullet, the maximum values of θ and φ stand in a constant ratio, regardless of the absolute magnitude of either. The maximum bending error does not depend on the speed of the bullet; but the swing error φ is merely the quotient of the transverse speed of of the muzzle by the speed of the bullet along the bore, and it therefore increases with reduced charges,

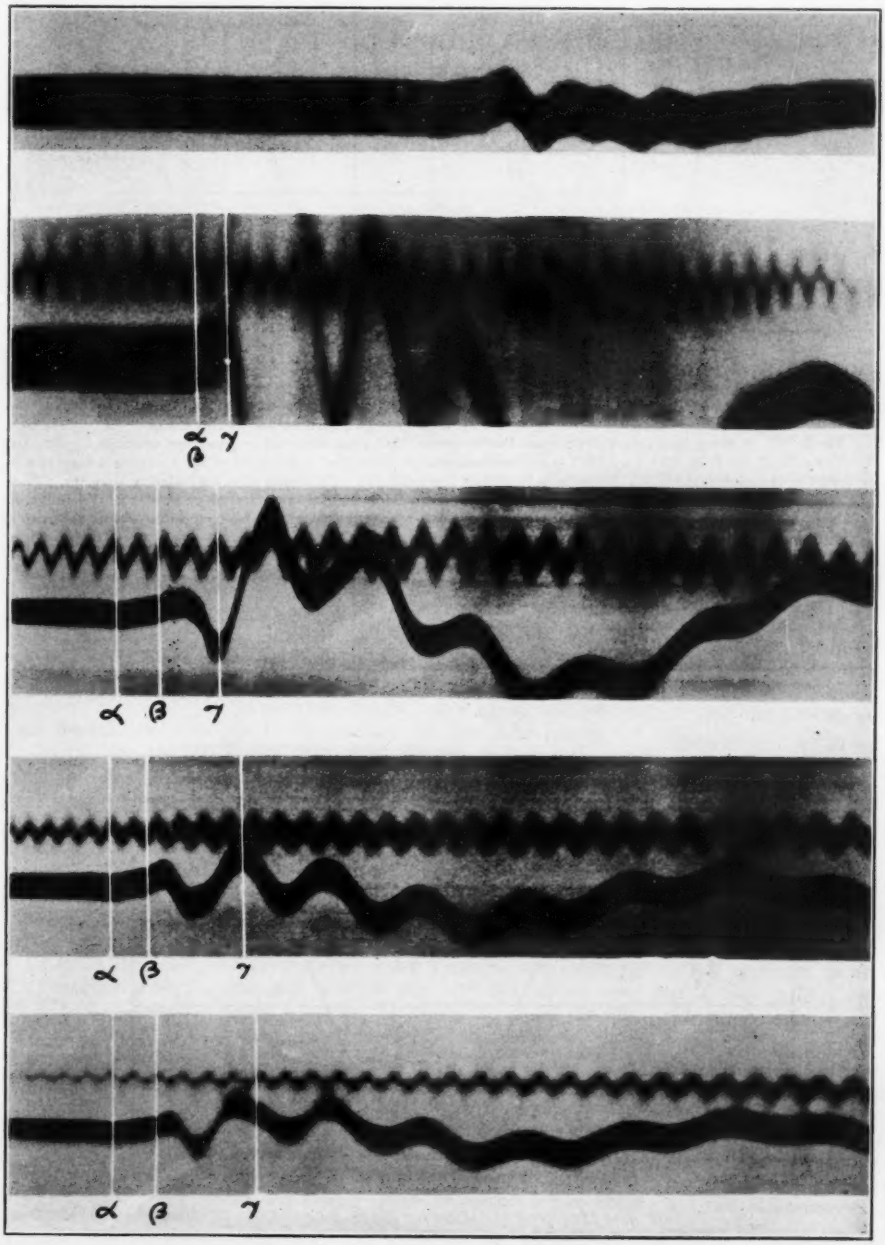


FIGURE 8. Model 71 Mauser by Cranz and Koch. (a) Vibrations of the muzzle due to the falling of the striker only. (b) Vibrations due to firing the cartridge electrically. (c) This is the record of muzzle vibration for one half charge. "The exit of the bullet occurred after ¾ of the 1st overtone, the muzzle is inclined downward and therefore the impact should be low, which was actually the case." (d) This is the record of muzzle vibration for one quarter charge. "The exit of the bullet occurs from 1 to 1¼ overtone vibrations, the muzzle is up, the shot would be expected to strike high, and this actually proved to be the case." (e) This is the record of muzzle vibration for one eighth charge. "The exit of the bullet occurs after 1½ cycles of the 1st overtone." The muzzle was in the normal position at this instant and "the shot was also normal." Above prints numbered top to bottom.

other things being equal.

To put is concisely, θ and φ are simple harmonic functions of the time of departure of the bullet, of the same period and at 90° phase difference. Hence, their sum δ is also a simple harmonic function of the time of departure and the maximum value that it can ever reach is given by the equation

$$(2)\quad (\delta \max)^2 = (\theta \max)^2 + (\varphi \max)^2$$

Its minimum value is equal to the smaller of the two errors.

Turning to the question of the absolute magnitude of the bending error, let B, Fig. 1, represent the position of the muzzle at the instant when the bullet leaves, the figure referring to vibration in the vertical plane and in the fundamental mode.

If the barrel remained straight, merely swinging about a fixed point A at the breech, we should have, since the angle is small, $\theta = h/l$; and at the range R this would make the bullet strike high by an amount

$$(3)\quad \theta R = \frac{h}{l} R$$

In reality, the barrel bends into a curve so that the tangent to the axis of the bore at the muzzle intersects the neutral position of the axis at some point C forward of the breech. Hence, in practice $\theta > h/l$; possibly as much as twice as great—and the resulting error at range R is correspondingly increased over the value given by (3). The maximum effect of this bending error will obviously occur if the bullet departs at the end of the swing when the displacement h has its maximum value (h max).

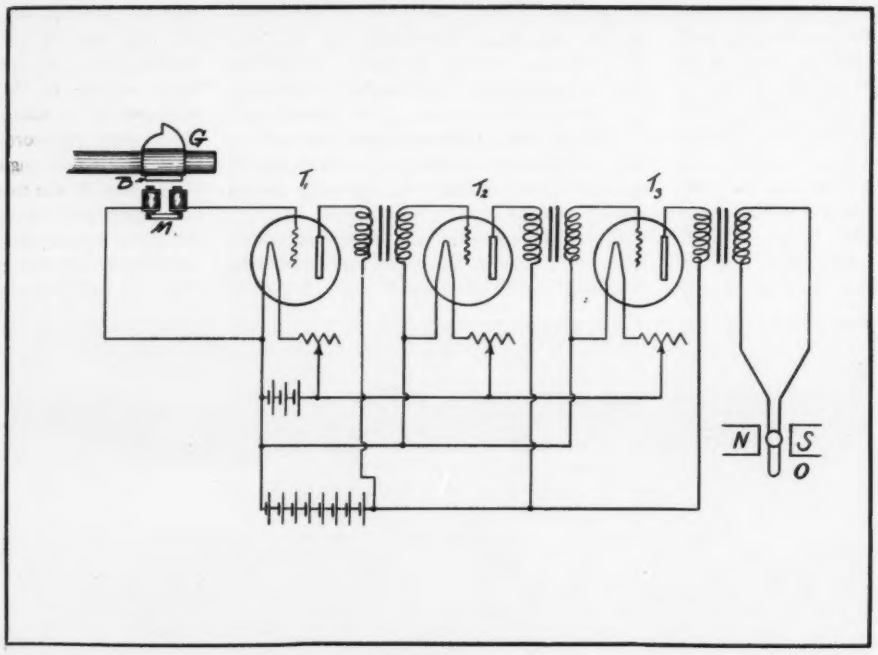


FIGURE 9. Diagram of the apparatus used by the author in obtaining the barrel vibration records described in this paper. At "G" is shown the rifle muzzle whose vibrations are to be recorded. "B" is a small iron block fastened to the under side of the barrel. "M" represents a magnet in the grid circuit of the first tube of a power amplifier with tubes T_1, T_2, and T_3. The oscillations of the muzzle "G" cause the block "B" to move back, and forth from the magnets "M" thus generating a voltage which is applied to the grid of the first tube T_1. "O" is an oscillograph consisting of a fine loop of wire having a very small mirror cemented across it. This loop is placed between the pole pieces of a very strong magnet. The voltage impressed upon the grid of the first tube depends upon the rate of change of flux in the magnet M and this in turn, when sufficiently amplified, determines the current which operates the oscillograph element "O". A beam of light reflected from the small mirror traces out a curve upon the moving film of a rotating high speed camera. Certain errors which occur by this method are discussed later on in this paper.

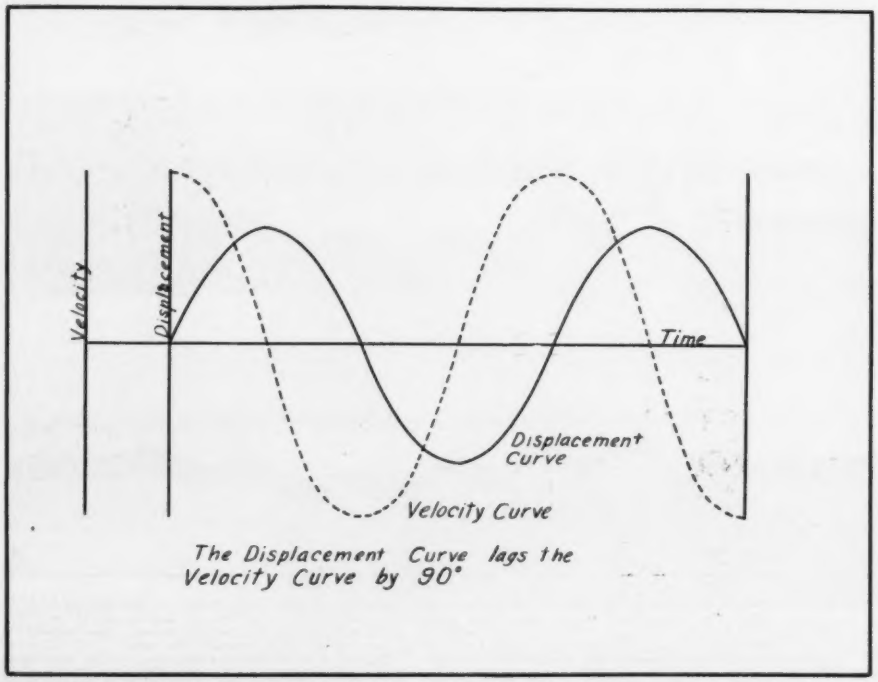


FIGURE 10-A. Diagram showing the displacement of the muzzle as deduced from the velocity curves. This drawing is explained in the text.

In the present investigation, the displacements of the muzzle were not measured and all that is known is that (h max.) was less than 0.025 or 0.044 cm. The length of the barrel was about 1=60 cm., so that the upper limit of the bending error would have been θ max=0.044/60 =0.0007, if the barrel had remained straight, or perhaps 0.0014 when allowance is made for the curvature of the barrel. This would mean that the bullet would strike about 4 ft. high at 1,000 yards; but it must be remembered that these are outside values because the amplitude of vibration of the muzzle may have been considerably less than 0.025. The figures are of interest only as giving an idea of the order of magnitude of the possible errors, and a complete investigation would have to include determinations of the amplitude (h max) and the form of the curved barrel, unless θ were measured directly.

The possibility of the bullet striking four feet high at 1,000 yards as just mentioned is not to be construed as meaning that variations of this magnitude are to be expected. If the phenomenon repeats itself accurately, its existence will not be apparent when once the proper sight setting has been obtained.

The foregoing paragraphs have had reference only to the fundamental vibration existing by itself, as illustrated schematically in Fig. 1;

but if we turn to the vibration in the first overtone, for which the bending of the axis of the bore is illustrated in Fig. 2, the reasoning is qualitatively the same as before.

Quantitatively, however, there is an important difference. The barrel does remain nearly straight from the muzzle to the node N, so that the point C is close to the node. But the node itself is only about 1/5 of the way from muzzle to breech, so that if h_1 is the displacement, the bending error at the instant represented is about

$$\theta = h_1/0.2\,l = \frac{5\,h_1}{l}$$

In other words, a given displacement produces about five times as large an error for the first overtone as for the fundamental.

From this it follows that when the two vibrations coexist, as they do in actual firing, if the amplitude of the overtone is at all comparable with that of the fundamental, the error due to the overtone is much the more important. From the investigation of Cranz and Koch, to be described later, it appears that for the old long Mauser rifle, the first overtone was, in fact, much more important than the fundamental.

In the case of higher overtones, the distance from the muzzle to the nearest node is still shorter; but the amplitudes of these higher tones are so small that it is not necessary to pay any attention to the errors due to them—at all events, not until the experimental technique has been much farther developed and refined.

If Figs. 1 and 2 represent the extreme positions of the axis of the barrel, the swing error vanishes and the bending error which we have been discussing is the whole error. If the muzzle is not in one of its extreme positions when the bullet emerges, the bending error is less, but the swing error must be added to it, as in Equ. (1). The maximum total error (δ max) is somewhat greater than the maximum bending error (θ max), as shown by Equ. (2), and (δ max) does not occur exactly at the end of a swing. But with the velocities due to ordinary service charges the additional effects of the swing error are relatively small, and for our present purposes it is not necessary to discuss them in detail.

Previous Investigations

Crehore and Squire* fastened to the muzzle of a .45-70—500 Springfield rifle a screen having small holes cut through it. A source of light was placed on one side of this screen and on the other a photographic camera with a large objective. When the gun was fired the light going through the perforations in the screen traced curves upon the plate. They concluded "that a Springfield rifle does not move appreciably before the bullet leaves the muzzle. Even if the motion were appreciable, its direction is such that it is parallel to the axis and does not affect the aim of the gun."

Cranz and Koch†, using an optical method similar in principle to that of Crehore and Squire, but with greater refinements, conducted an extended investigation of the vibrations of the barrel of the Model 71 Mauser. The barrel of this rifle is 80 cm. long, with a 11 mm. bore. The projectile weighed 25 grams, and the charge consisted of 5 grams of black powder. They concluded that the axis of the barrel is never coincident with the trajectory, but departs by some small angle δ, which changes from shot to shot and gun to gun and lies within one-fourth of a degree, depending upon the size and weight of the projectile, weight of powder, clamping, etc."

Their rifle was held in the supports shown in Figs. 4 and 5, reproduced from their paper. They found no material difference in the characteristics of vibration when held in this way and when fired free, providing the gun was not placed under an initial strain when clamped in the rest.

The table gives a set of values of the fundamental and first overtone obtained by Cranz and Koch on the Model 71 Mauser.

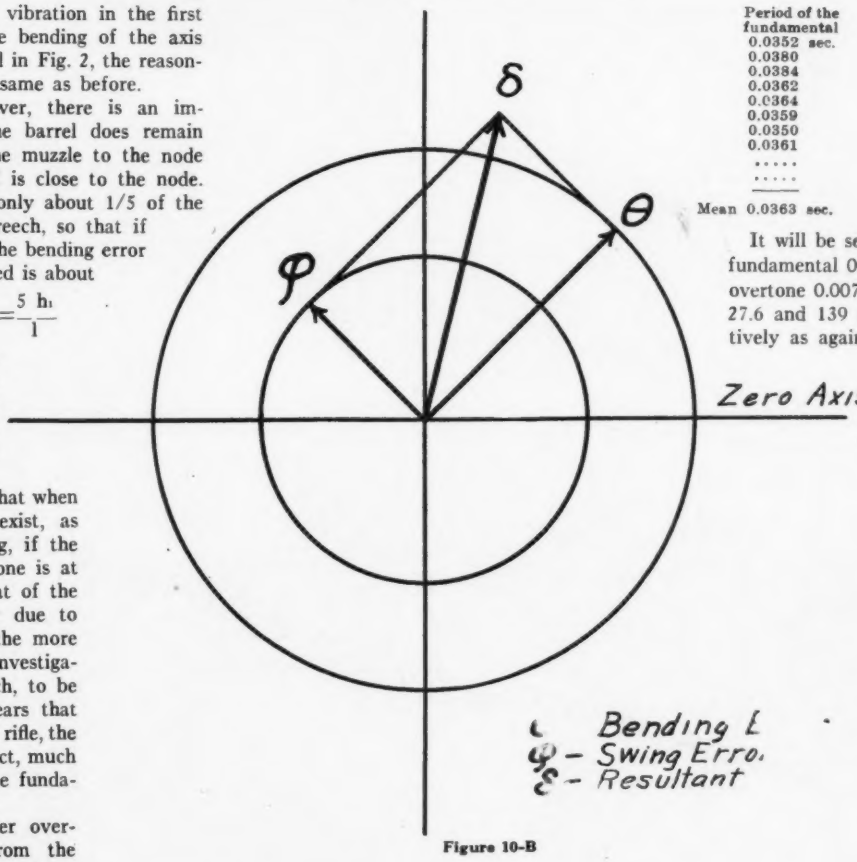


Figure 10-B

Period of the fundamental	Period of the first overtone
0.0352 sec.	0.00720 sec.
0.0380	0.00747
0.0384	0.00715
0.0362	.....
0.0364	.....
0.0359	.....
0.0350	.....
0.0361	.....
.....	0.00706
.....	0.00707
Mean 0.0363 sec.	Mean 0.0072 sec.

It will be seen that the period of the fundamental 0.0363 sec. and of the first overtone 0.0072 sec. give frequencies of 27.6 and 139 cycles per second respectively as against 23.8 and 148.8 cycles per second for the calculated values.

Considering the approximation necessary in determining the length of the barrel actually vibrating, the change in thickness of wall from breach to muzzle, etc., this must be regarded as a remarkable agreement with the calculated values.

The authors found that the higher overtones were damped out very rapidly, since they were inharmonic.

As a result of their investigation, Cranz and Koch write: "We can therefore with safety state the proposition: The vibration of a rifle barrel after discharge occurs in the fundamental and first overtone."

Of these two vibrations the second causes by far the greater error for an equal linear displacement as will be seen by referring to Fig. 6.

In reality, as previously mentioned, no one mode of vibration will ever occur by itself. The fundamental and first overtone—as well as the higher ones, for that matter—will always co-exist and be mixed together, so that, except at particular instants, the total linear displacement can not be attributed to either one alone.

AB in Fig. 2 or 6 illustrates the bending of a uniform bar clamped at one end and vibrating with its first overtone, "N" being a node or point of no motion. A rifle barrel may vibrate in a somewhat similar way, and Cranz and Koch have pointed out that the position of the node is of importance in determining the angular error δ The authors say it has often been erroneously assumed that this node "N" lies at the upper band, but the case proved to be otherwise. The rigidity of the steel barrel is so much greater than that of the wooden stock that, although the latter runs nearly to the muzzle in military rifles, nevertheless the mode of barrel vibration is not controlled by it.

By means of the classical method of dust or sand figures Cranz and Koch, by fastening

*Journal United States Artillery, Vol. IV, No. 4, October, 1895, pp. 670-676.

†Untersuchungen uber die Vibration des Gewehrlaufs von C. Cranz und K. R. Koch, loc. cit. Munchen Akademie Der Wissenschaften, Vol. 69, Abhandlungen Math.-Physic, C. L. 1896-99.

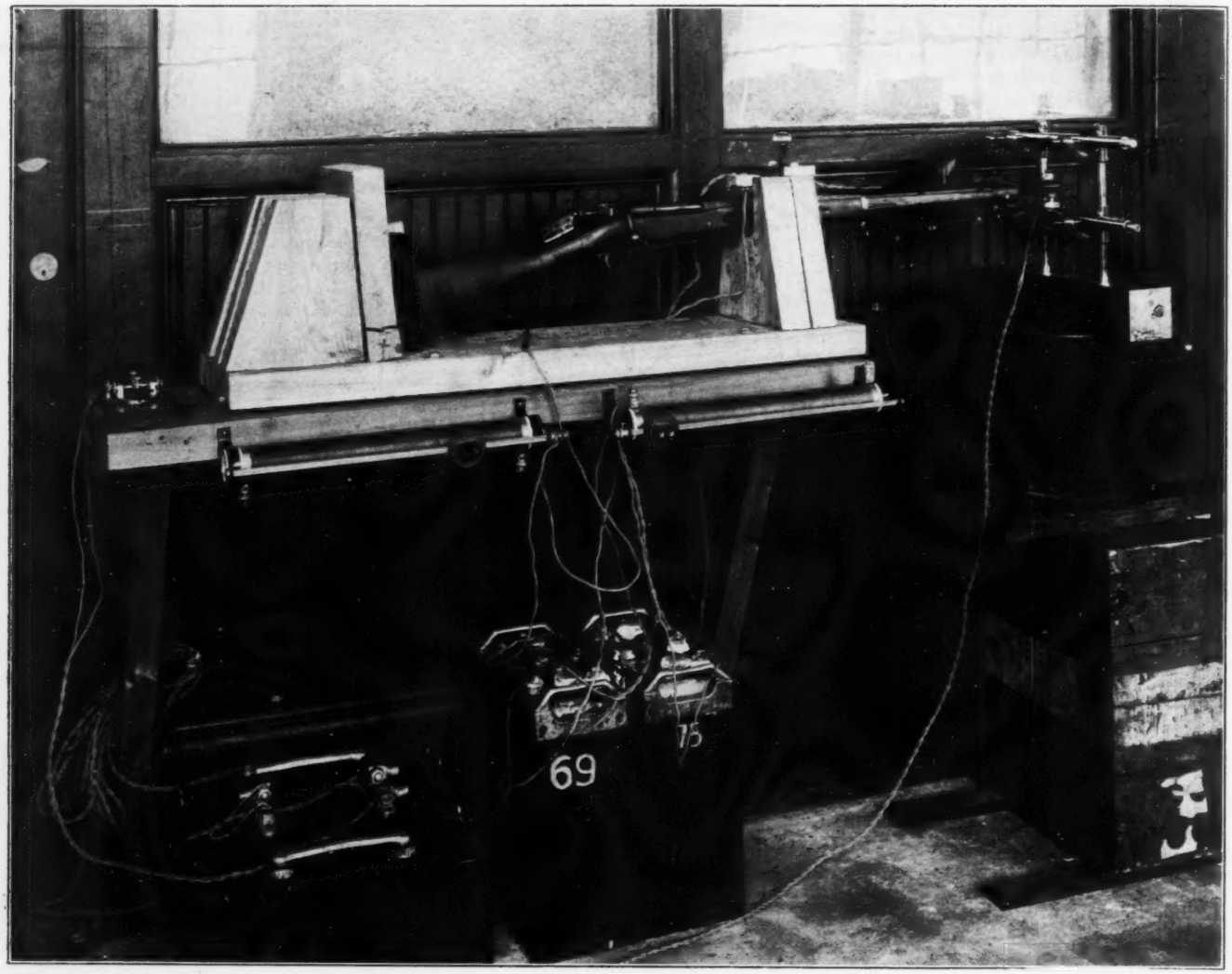


FIGURE 10. Part of the apparatus used by the author in obtaining the vibration records described in this paper. A detailed description will be found in the text of this paper.

a cardboard strip covered with dust along the top of the clamped rifle barrel, were able to determine the position of the nodes of the Model 71 Mauser with all the precision necessary.

For the Model 71 Mauser the point denoted by N in Figs. 2 and 6 was found to be 14.5 cm. back from the muzzle.

In Fig. 7 are reproduced five of the photographic records obtained by Cranz and Koch with the 71 Mauser. Concerning these they say "the bullet leaves the muzzle in the second quarter of the first overtone," and that this portion of the cycle was always upward for the Model 71 Mauser and tended to make the gun shoot high.

"Barrel vibrations at the muzzle, as shown in Plate I (our Fig. 7), are not due to a reaction at the instant of separation of the bullet from the muzzle because with smaller loads vibrations begin before the bullet leaves." See Fig. 8.

The portions of the conclusions of these experiments likely to be of interest to riflemen are given in the following paragraphs.

Cranz and Koch state the following results for Model 71 vibrating in the vertical plane passing through axis of barrel.

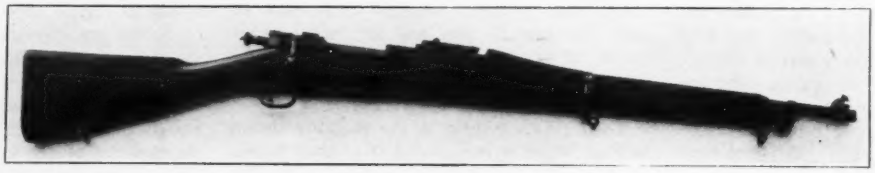


FIGURE 11. .30 caliber Springfield rifle Model of 1903.

(1) "The gun vibrates during the time from the discharge up to the moment when the projectile leaves the barrel. Apart from the known recoil motion, this is true for the clamped gun as well as for one lying free.

(2) "The distortion curve of the barrel at that moment and at any later moment may be accurately determined to a few thousandths of a millimeter by the described method of electrical instantaneous photography of several points of the barrel. In principle there is nothing to prevent using this method to determine the vibration of cannon and their carriages.

(3) "The observed vibrations of the barrel are very similar to those of a reed clamped at one end, namely, the barrel vibrates simultaneously in the fundamental tone with the period 0.0363 sec. and the first overtone with a period 0.0072. For the deviation of the projectile, overtone vibrations are most important. With normal load the foremost point which is at relative rest at the moment of exit of the bullet does not lie at a point on the barrel far back, but in the node point of the first overtone. This node lies not in a clamping ring, as has sometimes been

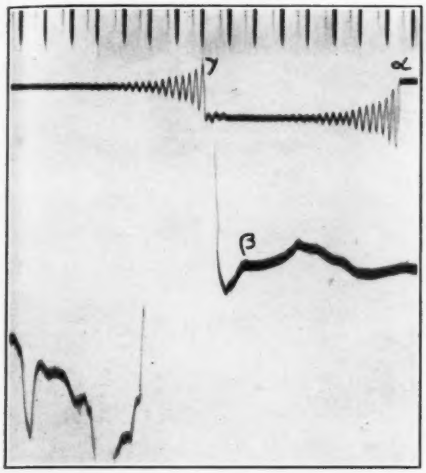


FIGURE 12. Motion of the Springfield muzzle in a vertical plane due to firing a service charge. The lower curve represents the motion of the muzzle. In the upper curve the point marked represents the instant at which the striker starts to fall. The striker hits the primer at β and at γ the bullet emerges from the muzzle. The short vertical lines at the top of the print are timing lines and are 1/1036.8 sec. apart in time. Motions up and down on the print correspond to similar motions of the muzzle.

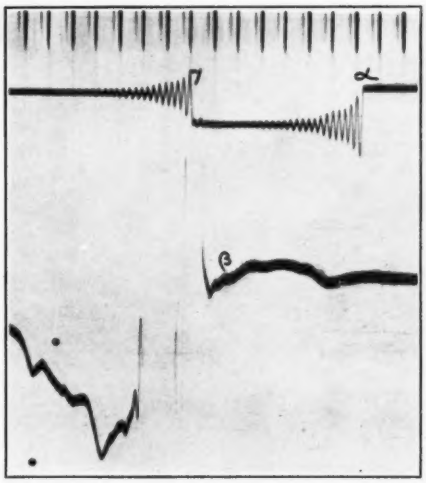


FIGURE 13. Motion of the Springfield muzzle in a vertical plane due to firing a service charge. This record is similar to Fig. 12. Striker starts to fall at α and hits the primer at β. The bullet clears the muzzle at γ.

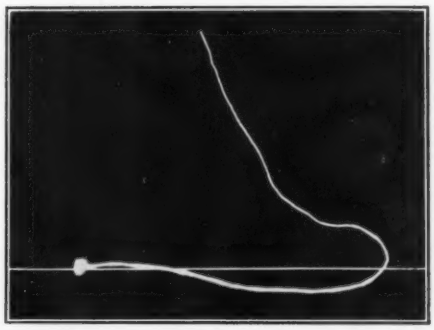


FIGURE 15. Magnified curve of the actual motion of the Springfield muzzle in a vertical plane. Motions to the right in the print correspond to rearward motion of the piece and and upward motion to a similar displacement of the muzzle. The horizontal line marks the axis of the bore before the piece was fired, and the heavy dot marks the starting point.

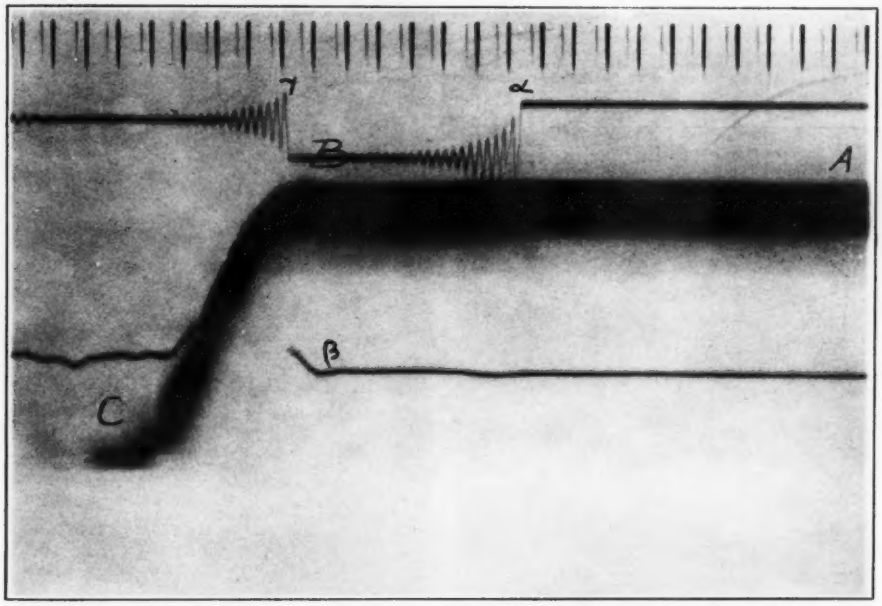


FIGURE 14. Composit record of Springfield muzzle for service charge. Striker starts to fall at α and hits the primer at β. The bullet clears the muzzle at γ. The curve ABC represents the horizontal component of the recoil, motion towards the bottom of the page corresponding to motion of the piece to the rear for this particular curve.

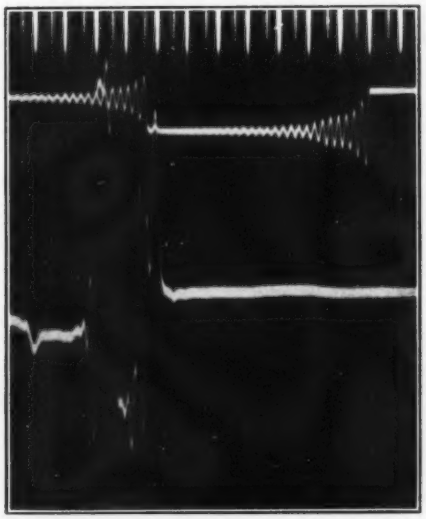


Fig.16

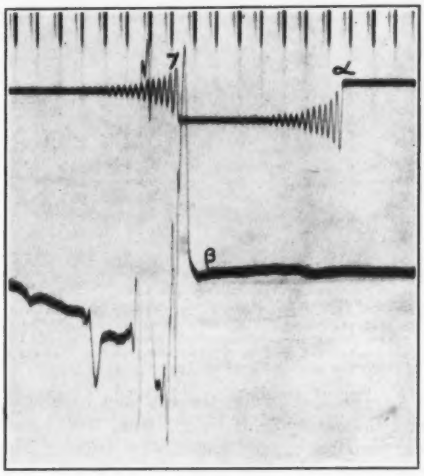


Fig. 17

assumed, but close to the point required by the theory of a transversely vibrating reed clamped at one end. This node can be made plainly visible by strewing sand on a strip of cardboard fastened along the barrel.

(4) "The smaller the selected load the more vibrations have occurred when the projectile leaves the barrel. This exit, therefore, occurs in a different phase of the vibration and consequently the error of deviation varies with the load."

Vibrations Due to Falling of the Cocking Piece, Striker, Etc.

Cranz and Koch found that the time elapsing between the first vibration of the muzzle and the exit of the bullet from it was more than twice as long as the known barrel time.* They, therefore, concluded that when the shot was fired, the barrel was already vibrating from the blow which the breech received when the striker fell.

In order to prove this they photographed the motion of the muzzle resulting from the falling of the striker alone and obtained the record shown in Fig. 8-A.

The authors say: "On every shot we have the following procedure:

(1) The striker goes down first and starts the barrel vibrating.

(2) Immediately following this the sudden expansion of the powder gases produces a blow in the direction of the axis, which likewise causes transverse vibrations of the barrel.

* The elapsed time between the ignition of the powder charge and the instant the bullet clears the muzzle.

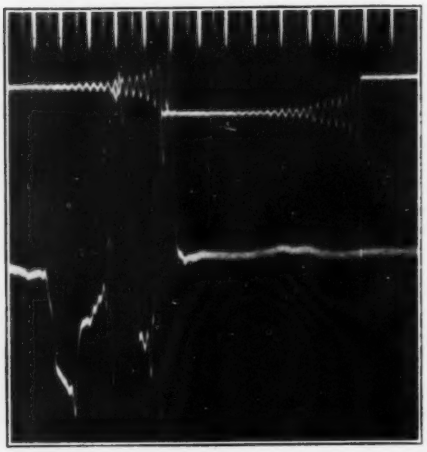


Fig. 18

FIGURES 16, 17 and 18. Record of the muzzle motion in a vertical plane for three service charges. Due to the very steep slope of these vibration curves the identification of the exact point at which the bullet exit occurred is a very difficult matter. It seems, however, from these three curves that the exit of the projectile must occur at about the middle of the second quarter of the first overtone velocity curve or perhaps a trifle lower. If we now suppose a displacement curve to be constructed in accordance with Fig. 10-A it is seen that the exit of the projectile occurred at or a little short of the peak of the first upward swing of the muzzle.

Hereafter when mention is made in this paper of the position of the muzzle at the time of the exit of the projectile it is to be understood that we refer to the actual displacement of the muzzle as deduced from the velocity curve in accordance with the explanation just given.

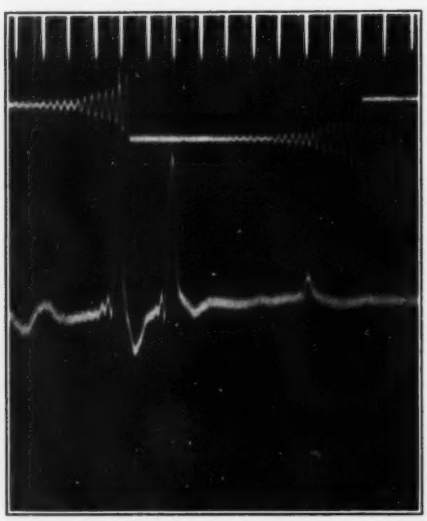


FIGURE 21. Motion of the Springfield muzzle in a vertical plane for a 1201 ft./sec. charge. When the projectile exit occurred the muzzle seems to be near the end of a downward swing. Therefore the shot will strike low.

(3) Because of this the gun goes backward and the projectile is forced from the chamber into the rifling, and a new impulse for transverse vibrations arises."

In the photographic records of Cranz and Koch here reproduced they designate by the interval $\alpha\beta$ the vibrations due to the falling of the striker and the interval $\beta\gamma$ those vibrations due to the powder gases.

In order to test the correctness of their conclusions, Cranz and Koch arranged to fire some of their cartridges electrically, one of

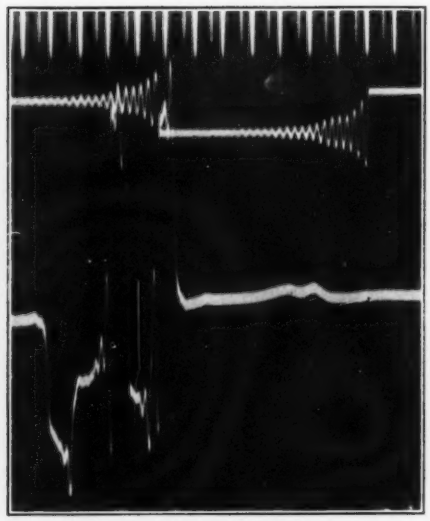


FIGURE 19. This record was taken in order to show the effect of a coating of oil in the barrel. Just before firing the cartridge for this record the barrel was given a coating of light oil, having been dry on the previous shots. The result of the coating of oil in this particular case seems to have been to make the exit of the projectile occur a little earlier than in the case of a dry barrel which in this case would cause the bullet to strike somewhat lower than usual.

It should be distinctly understood however, that no claim is made that all oiled or greasy barrels shoot lower than dry barrels. They may shoot high, low or without error depending upon the natural frequency of the particular barrel in question, cartridges and many other factors.

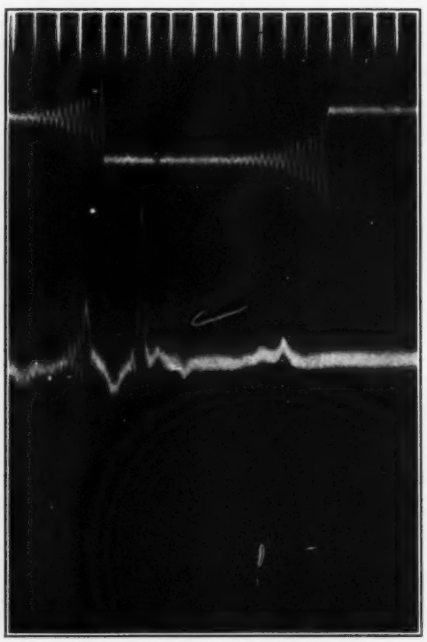


FIGURE 22. Motion of the Springfield muzzle in a vertical plane for a 998 ft/sec. charge. The muzzle was apparently at the end of a downward swing at the instant when the projectile exit occurred. The amplitude of the vibrations has decreased with the reduction of the charge but more cycles are executed before the exit of the projectile.

the records being shown in Fig. 8-B, which they say fully confirmed their assumptions.

In Figs. 8-C, 8-D and 8-E are reproduced three of the photographic records of the barrel vibrations of the Model 71 Mauser taken from the work of Cranz and Koch.

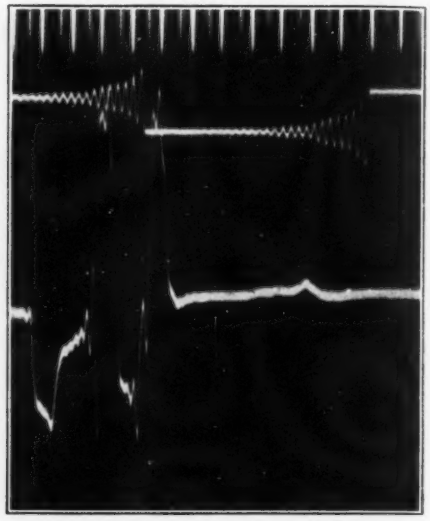


FIGURE 20. Record of the muzzle motion of the Springfield in a vertical plane for a 2008 ft/sec. charge.

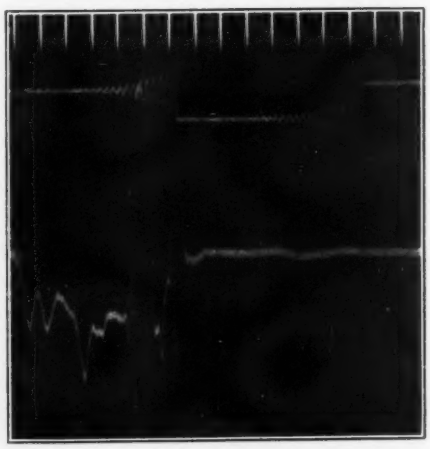


FIGURE 23. Motion of the Springfield muzzle in a horizontal plane resulting from firing a service charge.

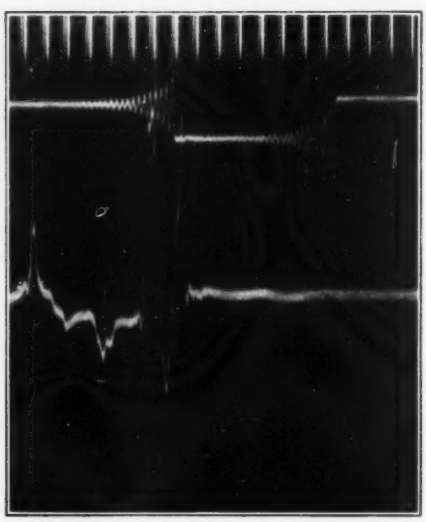


FIGURE 24. Motion of the Springfield muzzle in a horizontal plane for a 2008 ft/sec. charge.

PLATE V.—PART II. [*To face p.* 213.

BARREL VIBRATIONS WITH ·303 SHORT RIFLE, MARK I.

Observed velocity f/s.	2360	2597	2609
Point of Impact at 100 ft.	2·4 ins.	3·45 ins.	4·3 ins. low.

The white vertical line marked "e" indicates the point of exit of the bullet in each case.

FIGURE 27. Barrel vibrations with the .303 Short Enfield Rifle, Mark 1 (British Text Book of Small Arms for 1909).

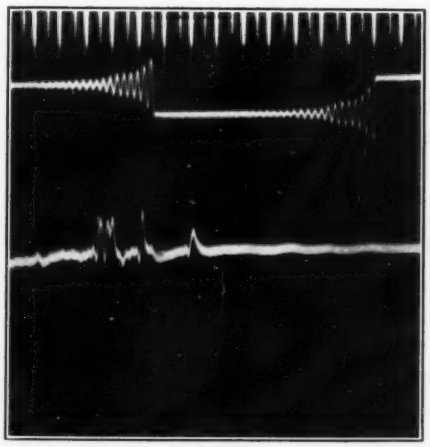


FIGURE 25. Motion of the Springfield muzzle in a horizontal plane for a 1201 ft/sec. charge. The exit occurred just after the maximum of a swing to the right.

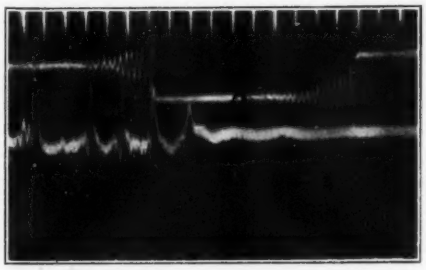


FIGURE 26. Motion of the Springfield muzzle in a horizontal plane for a 998 ft/sec. charge. The exit occurred as the muzzle approaches zero displacement from the right.

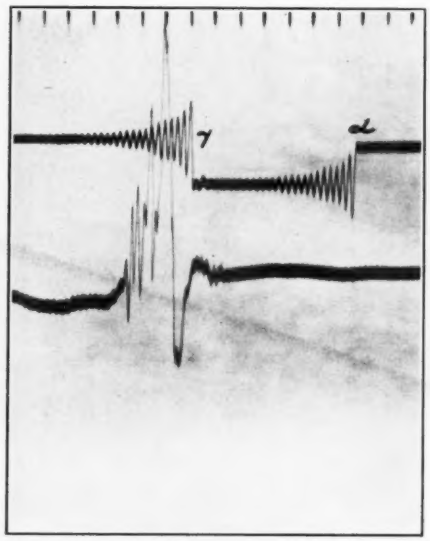


Fig. 29

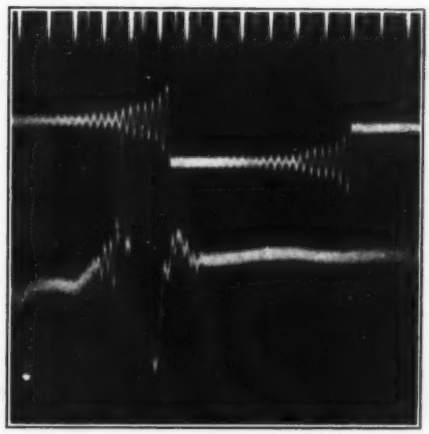


Fig. 30

FIGURES 29 and 30. Motion in a vertical plane of the .30 caliber match Springfield muzzle, firing a service charge. In each case the exit occurred just beyond zero displacement and on the peak of the first cycle.

Fig. 8-C gives the vibration record for half charge: "The exit of the bullet occurred after three-fourths of the first overtone, the muzzle is inclined downward and therefore the impact should be low, which was actually the case."

Fig. 8-D gives the vibration for quarter charge. "The exit of the bullet occurs from 1 to 1¼ overtone vibrations, the muzzle is up, the shot would be expected to strike high, and this actually proved to be the case."

Fig. 8-E gives the vibration for one-eighth charge: "The exit of the bullet occurs after 1½ cycles of the first overtone." The muzzle was in the normal position at this instant and "the shot was also normal."

Concerning these experiments the authors have these very interesting conclusions:

"The higher the velocity of the projectile the less the barrel vibration at the time of exit; hence, the greater the accuracy. It might be advisable to use the highest velocity possible if other factors do not enter."

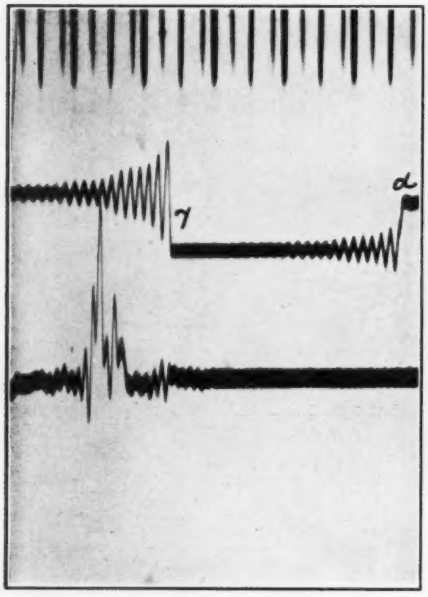


Fig. 31

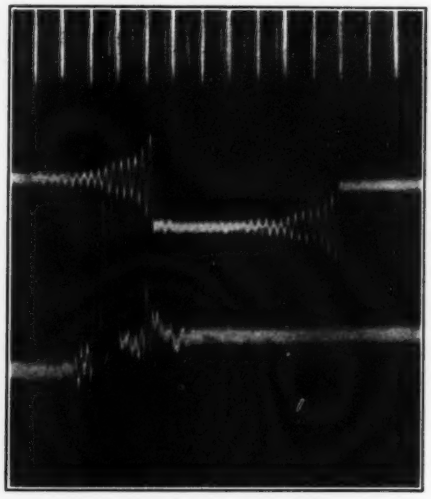


Fig. 32

FIGURES 31 and 32. Vibration of the muzzle of the .30 caliber heavy Springfield barrel in a horizontal plane due to firing the service charge. The muzzle was near the zero axis when the projectile exit occurred but its amplitude is very much less than that of the Service Springfield.

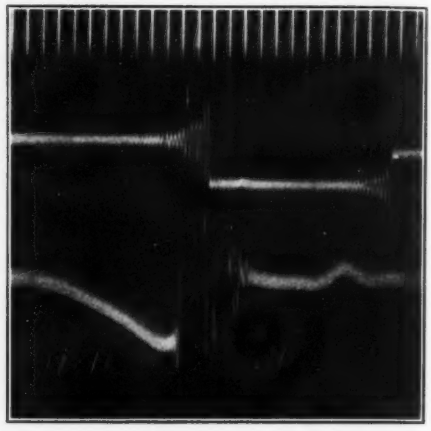


FIGURE 34. Vibration of the 45-70 Springfield Rifle muzzle in a vertical plane due to firing the 500 grain bullet. The muzzle vibrations are vastly greater for this long barreled rifle than for those of the heavy barrel Springfield. The exit seems to have occurred near the zero axis on a downward swing but the presence of many high harmonics makes the determination of this point a very difficult matter.

Apparatus for the Determination of the Frequency of a Vibrating Gun Barrel.

The apparatus used in the writer's experiments for the determination of the frequency of oscillation of a vibrating rifle muzzle is indicated schematically in Fig 9, and the actual apparatus is shown in Fig. 10.

The rifle muzzle is shown at "G." Fastened to the under side at 'B" is a small steel block which acts as an armature for the telephone magnets "M." T_1, T_2, and T_3 are the tubes of a two-stage vacuum tube power amplifier which drive the oscillograph element "O:"

The oscillograph element, which is used to record the motion of the muzzle of the piece, has a natural frequency of about 4,000 cycles per second. It is slightly underdamped with a mixture of heavy liquid petrolatum having a small quantity of paraffin dissolved in it. Since this element is underdamped, its natural frequency of 4,000 cycles per second sometimes appears as a high frequency ripple superimposed upon the wave of the phenomena being recorded.

The operation of this apparatus in general is as follows: When the armature "B," fastened to the rifle barrel, is stationary the flux due to the permanent magnets upon which the coils are wound is not changing and therefore the voltage on the grid of the first tube is also stationary. If, however, the armature "B" is moved suddenly a small distance either toward the magnets "M" or away from them, then a voltage proportional to the rate of change in the flux is applied to the grid of the first tube.

By giving the armature a light blow and driving it suddenly towards the magnets "M," a deflection of the oscillograph element "O" in a given direction will be obtained. If we note this direction, we can determine from the vibration records made subsequently whether at any given instant the muzzle is moving up or moving down.

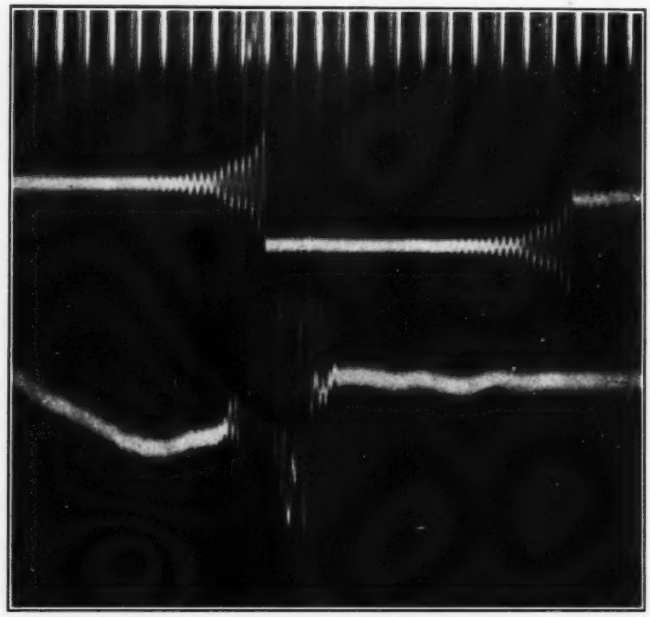


FIGURE 35. Lateral vibrations of the muzzle of the 45-70 Springfield rifle muzzle. The determination of the exit point is difficult but the original negative seemed to indicate that the bullet cleared the muzzle near the maximum of a swing to the right.

In referring to the records obtained with this apparatus it must be kept in mind that the oscillograms are in reality records of the transverse velocity of the muzzle. However, the velocity is zero when the displacement is a maximum and greatest when the displacement is zero. Hence, the points of maximum and minimum displacement of the oscillograms correspond respectively to points of minimum and maximum displacement of the muzzle. Add to this that an upward or downward motion of the muzzle produced a similar motion in the oscillograph velocity curve and we see that the displacement curve lags the velocity curve by 90 degrees. The foregoing remarks are illustrated in Fig. 10-A.

Our standard of time in these experiments has been an electrically driven tuning fork with a frequency of 518.4 cycles per second. The oscillations of this fork are maintained by a suitable vacuum tube drive which in turn drives a second oscillograph element about a horizontal axis. In this way the short lines seen at the top of our films have been obtained and represent time intervals of 1/1036.8 second.

The camera takes a film five feet long and may be controlled as to film speed by means of a rheostat in the armature circuit of the driving motor. It has been convenient to take some of the films at quite high film speeds as is evident by the interval between timing lines of some of the records.

With this apparatus we may readily determine the approximate frequency of vibrations existing for only a few cycles. We cannot, unfortunately, tell very much about the amplitude of the vibrations indicated by the records except in a very general way.

A recording system such as we have described is not without its drawbacks. A transformer coupled amplifier is not entirely distortionless even when special transformers are employed. The wave shapes of e. m. f.'s generated in the telephone magnet due to a

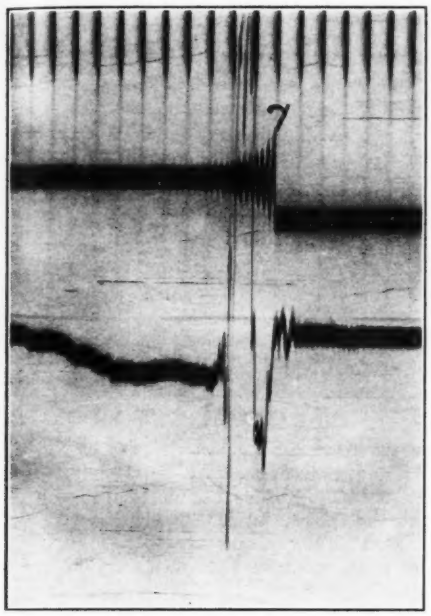


FIGURE 36. Motion in a vertical plane of the muzzle of a .30 caliber Schutzen rifle firing a service charge. The barrel vibrates very little prior to the exit of the bullet.

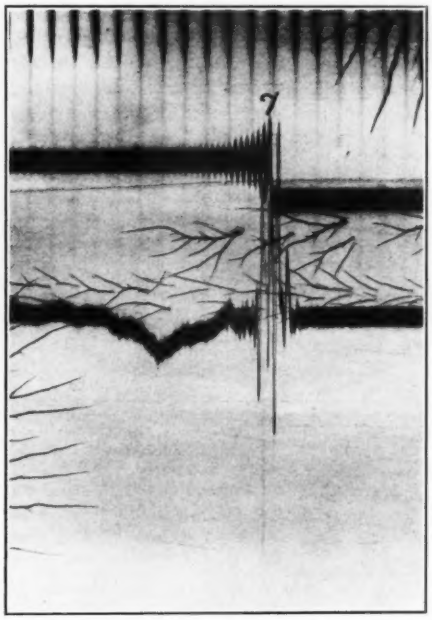


FIGURE 38. Motion in a horizontal plane of the muzzle of a .30 caliber Schutzen rifle firing a service charge. The lateral vibrations are apparently somewhat greater than those in the vertical plane for this particular arm and cartridge.

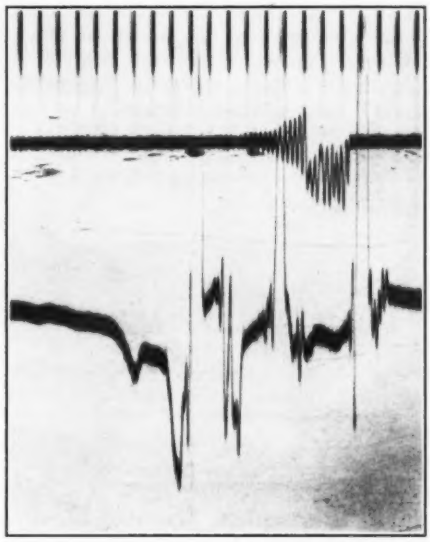


FIGURE 41. Vibrations in a horizontal plane of the muzzle of the .52 caliber Sharps carbine.

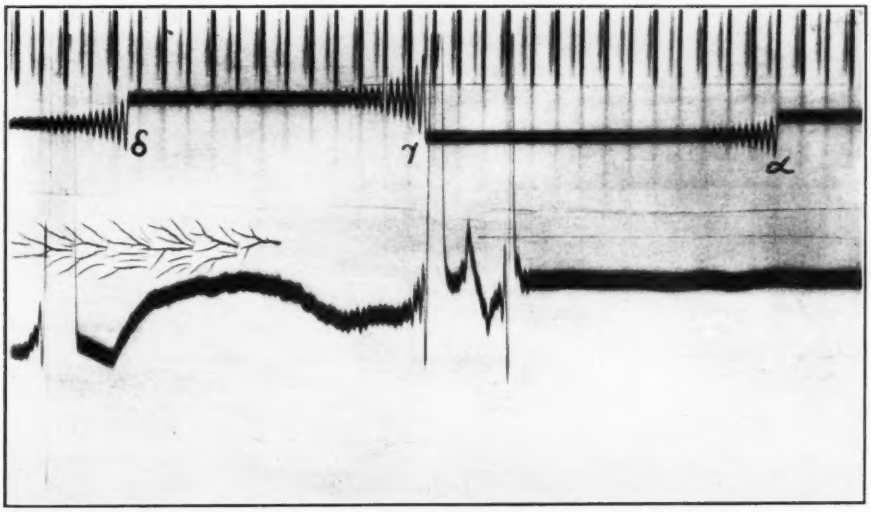


FIGURE 40. Vibrations of the muzzle of Sharps .52 caliber carbine in a vertical plane. The muzzle was apparently on a downward swing having just passed through a maximum displacement when the bullet exit occurred. This record also contains the data for velocity determinations described in this paper

simple harmonic motion of the armature are not good sine waves. Such waves are considerably fore-shortened on the half of the cycle which lies on the magnet side of the axis of no displacement. A resistance coupled amplifier of proper design and specially shaped pole pieces for the magnet would reproduce wave forms with much greater accuracy than the present apparatus.

As opposed to the more faithful reproduction of wave shapes which may be obtained with the optical method employed by Cranz and Koch, the system described in this paper has several important advantages over the older method.

(1) Much greater amplification of very small motions is possible so that slight oscillations of the muzzle which would escape detection by the optical method are easily investigated.

(2) This method requires no dark room or optical adjustments. It could easily be applied to heavy ordnance under field and range conditions.

(3) Our determinations of projectile exit times are probably more accurate than those depending upon the spark method employing an induction coil.

The Rifle Rest

In mounting the 0.30 caliber Springfield rifle (see Fig. 10) for these tests we have purposely avoided backing the butt against a concrete wall or the use of similar methods. The rest is of wood and firmly braced. The butt of the rifle rests against a rubber pad about one centimeter thick, backed by the wooden stop of the rest. The butt is lightly clamped on each side between suitable wooden jaws to insure steadiness. The rifle is supported just forward of the rear sight in a cardboard lined "U"-shaped groove made in the top of the supporting post. The piece is held in this front support with an ordinary thumb screw lightly clamped. When held in this way the rifle is not under initial strains due to the rest, which approximates as closely as is feasible, within the limitations of the experiment, to conditions in the field and on the range.

A suitable electrical contact is provided at the breech by means of which a circuit is broken just as the cocking piece starts to fall. The exit of the bullet at the muzzle cuts a light (No. 28) copper wire stretched across the muzzle. Due to stretching the position of the bullet at the instant it cuts the wire is uncertain by a small amount, probably not exceeding 0.0001 second in time. This value is in reality about the width of our timing lines and too small to cause us any worry in the conclusions we are to draw. The instant at which each circuit is broken is registered on the film by a third oscillograph element.

Apparatus for Holding the Telephone Magnets

This apparatus, shown in Fig. 10, consists of a base made of a piece of cold rolled steel 3 inches square and 12 inches long. Three inches from each side of the center and in the middle of one of the three-inch faces two ¾-inch cold rolled steel bars 12 inches long are inserted in holes perpendicular to that face of the bar. By means of clamps two additional bars of similar dimensions are clamped across the first two, thus forming a rigid support to carry the telephone magnets. The natural frequency of this steel frame is so much higher than the frequencies we are attempting to measure that resonance effects are eliminated.

Records Obtained with Our Apparatus of the Vibrations of the Barrel of the 0.30 Caliber Springfield Rifle

We now present a series of records obtained at the Bureau of Standards of the motion of a point one inch back from the muzzle of the 0.30 caliber Springfield rifle, that is to say, directly under the front sight.

FIGURE 28. Heavy barrel .30 caliber match Springfield rifle.

At the top of the record will be seen a row of vertical timing lines. The space or interval between two lines represents a little less than 1/1000 second in time. The trace below the timing lines shows at α the instant at which the cocking piece starts to fall, and at γ the instant at which the projectile leaves the muzzle. The total time required for the projectile to leave the muzzle after the release of the cocking piece can then be found at once by referring these two points α and γ to the time scale and counting the time spaces between them. The third trace on the lower part of the film shows (at β) the instant at which the primer is ignited. Vibrations to the right of β are due to falling of the striker.

Because of the nature of the recording system the peaks of the curves are apparently considerably sharper than in reality. This, however, does not affect either the determination of frequency or the projectile exit data.

In referring to the records we have obtained of the motion of the muzzle of the Springfield we shall designate the instant at which the cocking piece starts to fall by α. The average time required for the cocking piece to fall was obtained experimentally and found to be .006 second. The individual measurements were as follows:

Trial	Number of Time Intervals
1	6.2
2	6.3
3	6.4
4	6.0
	Average 6.2

$$\text{or } \frac{6.2}{1{,}036.8} = 0.006 \text{ sec. approximately.}$$

We shall denote by β the point at which the striker hits the primer, this point being taken 0.006 second after the start of its motion.

The exit of the projectile from the muzzle will be denoted by γ. The means by which the points α, β, and γ are determined have already been explained.

It seems advisable not to draw vertical lines or scratches on the films to indicate various points, since these lines obliterate a portion of the record. The points are, however, easily checked.

In taking some of these records it was necessary to use the 220-line voltage as a source of plate potential in lieu of the usual storage batteries. For this reason the element used to record the motion of the muzzle is not perfectly steady, but vibrates through a small amplitude at a rate of about 1,000 cycles per second. This feature of some of the records, while not desirable, does not seriously interfere with our investigation in the few cases in which it was employed. This unsteady line voltage of rather high frequency may possibly be due to the commutator of the generator.

Most of the records have been taken with the magnets distant 0.025 inch from the small steel block under the rifle muzzle. In order to accentuate certain features we have in some instances changed this distance, the camera film speed and other factors.

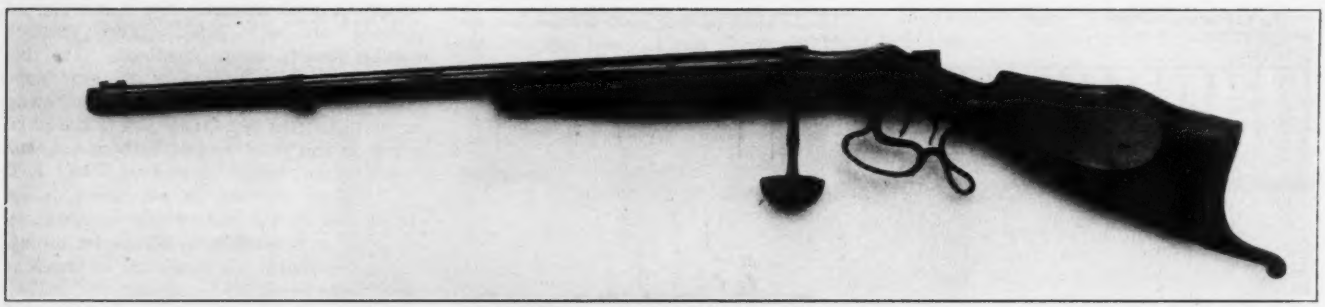


FIGURE 37. .30 caliber Schuetzen rifle.

Cartridges Used in These Experiments

I. 150-grain Service bullet;
R. A. H. 18, Lot No. 251;
II. 150-grain Service bullet;
26.3 grains du Pont No. 80, Lot 1,411.

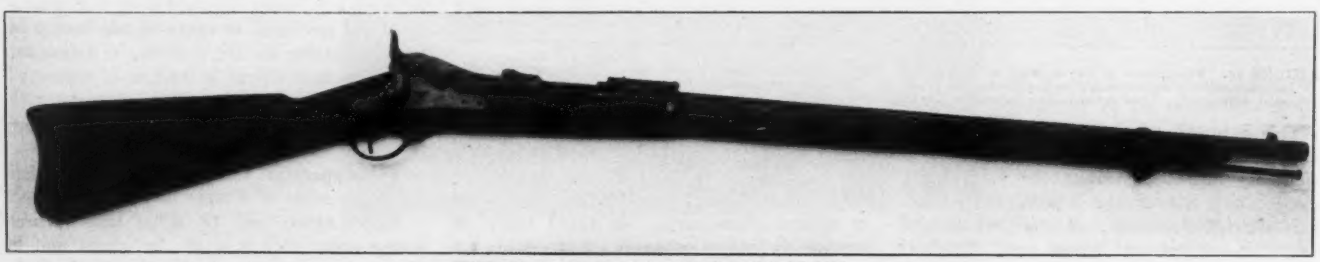


FIGURE 33. 45-70 Springfield Rifle Model 1873.

F. A. March, 1925; velocity 2,008 f. s.
III. 150-grain Service bullet;
13.5 grains du Pont No. 80, Lot 1,411;
F. A. March, 1925; velocity 1,201 f. s.
IV. 150-grain Service bullet;
11.5 grains du Pont No. 80, Lot 1,411;
F. A. March, 1925.

The special cartridges listed as II, III and IV were obtained by the Bureau of Standards

for special tests in March, 1925, through the courtesy of Frankford Arsenal. The velocities noted are those determined by the Arsenal.

VIBRATIONS IN A VERTICAL PLANE OF THE MODEL 1903 SPRINGFIELD, MARK I, RIFLE NO. 1065818

This rifle is shown in Fig. 11. With sufficient amplification the disturbances of the muzzle resulting from the falling of the striker and the initial stages of the ignition of the powder may be obtained on a much larger scale than is indicated on most of our prints. Figs. 12 and 13 show the results of firing two service charges. Here the motion of the muzzle, before the emergence of the bullet, of only a few thousandths of an inch has been greatly magnified. Very much greater amplifications are possible with our apparatus. If, however, we make the amplification resulting from the striker disturbances so that amplitudes such as those in Figs. 12 and 13 are obtained, then the portion of the curve occurring at the bullet exit has a double amplitude of six or eight inches, which is much too wide for our film. The two curves shown in Figs. 12 and 13 are by no means identical, but they do exhibit the same general characteristics; that is to say, they rise and fall together and have similar general outlines. The amplification was too great in these films to determine the phase of muzzle motion at the bullet exit. By means of a brightly illuminated slit mounted one inch back from the muzzle and a suitable lens system we have also recorded the horizontal component of the rifle's recoil motion on the same film with the vibration record. See ABC, Fig. 14. This record was obtained with only two tubes of the power amplifier, and hence was very much less sensitive than most of our others which were obtained with three tubes operating. The record is not very definite, but apparently a very slight forward motion of the muzzle occurs at point "B" of the recoil curve ABC. This occurs at about the instant of the ignition of the charge, or perhaps a trifle later. The motion is then to the rear until the rubber pad of the rifle rest has been compressed to "C." The energy stored in the compressed pad then throws the rifle forward again and rather violent disturbances are produced, which are, however, of .no special interest and are omitted.

It will be seen that the exit of the projectile occurs before any appreciable recoil has taken place. It must be clearly understood that the black line ABC of Fig. 14 records only the horizontal component of the rifle's recoil motion.

Fig. 15 is a recoil record of the motion of the muzzle of the Springfield rifle in a vertical plane after firing the service charge. The actual recoil was about one-half inch. This record was taken with a brightly illuminated pin hole, mounted one inch back from the muzzle, and a suitable lens system. We see that as the piece was fired in the rest, the muzzle starts backward; it also rises very slightly at first and then drops below the horizontal. At its rearmost position it rebounds from the rubber pad and continues upward. It was necessary to retouch this plate in order to reproduce it since the spot of light passed over the film surface too rapidly to affect the emulsion sufficiently for reproduction.

The exit point of the projectile is not shown in Fig. 15, but from Fig. 14 it will be seen that the exit occurs before any appreciable backward motion of the piece has occurred.

Figs. 16, 17 and 18 show the record of muzzle motion for three service cartridges. Due to the very steep slope of these vibration curves the identification of the exact point at which the bullet exit occurred is a very difficult matter.

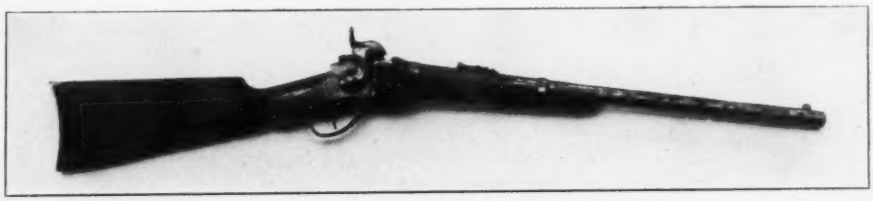


FIGURE 39. Sharps. .52 caliber percussion carbine.

It seems, however, from these three curves that the exit of the projectile must occur at about the middle of the second quarter of the first overtone velocity curve or perhaps a trifle lower. If we now suppose a displacement curve to be constructed in accordance with Fig. 10-A it is seen that the exit of the projectile occurred at or a little short of the peak of the first upward swing of the muzzle.

Hereafter when mention is made in this paper of the position of the muzzle at the time of the exit of the projectile it is to be understood that we refer to the actual displacement of the muzzle as deduced from the velocity curve in accordance with the explanation given in conjunction with Fig. 10-A.

Before firing the cartridge recorded in Fig. 19 the barrel was given a coating of light oil, having been dry on the previous shots.

The result of the coating of oil in this particular case seems to have been to make the exit of the projectile occur a little earlier than in the case of a dry barrel, which in this case would cause the bullet to strike somewhat lower than usual.

It should be distinctly understood, however, that no claim is made that all oiled or greasy barrels shoot lower than dry barrels. They may shoot high, low or without error, depending upon the natural frequency of the particular barrel in question, cartridges and many other factors.

A corresponding effect would probably be obtained for the horizontal plane or lateral vibration. This may explain in part why a rifle or revolver will usually shoot better after one or two so-called "drying shots" by means of which the oil in the barrel is removed.

Fig. 20 is the record of muzzle motion resulting from firing one of the 2,008 ft./sec. charges. The exit of the projectile seems to have occurred at the top of the first upward swing. The muzzle is above the axis of the bore as the gun was aimed.

Fig. 21 shows the record of the muzzle motion resulting from firing one of the 1,201 ft./sec. charges. At the instant of exit of the projectile the muzzle seems to be near the end of a downward swing. Therefore the shot will strike low.

Fig. 22 shows the muzzle motion resulting from one of the 998 ft./sec. charges. At the instant of the projectile exit the muzzle was at the end of a downward swing, and hence the shot would strike low.

The records just given confirm the conclusions of earlier experimenters that the lower the charge the more vibrations have developed before the exit of the projectile occurs. The amplitude of these vibrations is, however, correspondingly diminished.

VIBRATIONS OF THE SPRINGFIELD RIFLE IN A HORIZONTAL PLANE

In these prints referring to horizontal or lateral vibrations of the Springfield muzzle, motion towards the timing lines or upward corresponds to a motion of the muzzle to the left as the gun is ordinarily fired from the shoulder.

Fig. 23 is the record of the muzzle motion resulting from firing a service charge. The exit of the projectile seems to have occurred a little before reaching the maximum of a swing to the left.

If the drift is continuously to the right, the fact that the muzzle is actually on a left swing at the instant when the projectile emerges from the barrel may account for the table found in the "Description and Rules for the Management of the United States Rifle Caliber 0.30, Model of 1903" of 1917 and reproduced below.

DRIFT OF TARGETED RIFLES, MODEL OF 1905, SIGHTS GRADUATED FOR 1906 AMMUNITION

	Total Drift	
	Left	Right
Range (Yds.)	Inches	Inches
100	0.26	
200	0.42	
300	0.45	
400	0.32	
500	0.0	
600		0.55
700		2.0
800		4.5

Et cetera.

If the above hypothesis be the correct one, then a continuous right drift would bring the projectile back across the line of sight at a certain distance usually called the point-blank range.

In Fig. 24 is shown the record for lateral vibration of the muzzle with a 2,008 ft./sec. charge. The exit of the projectile occurs at the maximum of a swing to the left.

In Fig. 25 is shown the record for a 1,201 ft./sec. charge. The amplitude of the oscillations is very much less. The exit occurred just after a maximum swing to the right.

In Fig. 26 we have a record of the muzzle motion for a 998 ft./sec. charge. The exit occurs as the muzzle approaches zero displacement from the right.

Natural Period of Springfield Determined by Striking

In order to determine the modes of vibration of a gun barrel with our apparatus it is only necessary to strike the muzzle a light blow and record the resulting motion as the oscillations die away. In this way we obtained for the fundamental of the .30 caliber Springfield 61 cycles per second. The first overtone did not last long enough to permit us to determine its frequency anywhere near as accurately as it was possible to measure the fundamental. Only three cycles were executed before other oscillations combining with it produced a wave shape in which the harmonic could not be identified. From the three cycles executed an approximate frequency of 432 cycles was obtained.

British .303 Short Rifle, Mark I

In the plate facing Page 213 of the British Text Book of Small Arms, 1909, our Fig. 27, are shown three records of the British .303 Short Rifle, Mark I. These records were obtained by the method of Cranz and Koch mentioned previously in this paper. The fact that the vibrations of the Mark I rifle as they are recorded on this plate are very much smaller than those which we have shown in this paper of the .30 caliber U. S. Springfield does not mean that the vibrations of the Springfield are greater than those of the Mark I rifle. Our apparatus, as it was adjusted at the time these records were taken, was probably at least 10 times as sensitive as that used for the Mark I rifle.

Torsional Vibrations of the Muzzle of the .30 Springfield

In an attempt to detect torsional vibrations of the muzzle of the Springfield we arranged two telephone magnets, one above and the other below a short horizontal bar fastened around the muzzle of the piece. If the muzzle moved in a vertical plane the bar moved away from one magnet as it moved towards the other and the resulting induced voltage was a minimum for proper coil connections. For lateral motions of the bar it merely moved parallel to the pole pieces, and since the bar was wide enough to cover them for all such movements, no appreciable change occurs.

For torsional vibrations, however, the bar moves towards one as it moves towards the other and the induced voltage is a maximum. Since this voltage is applied to the grid of the first tube of the power amplifier, the oscillograph element, which it drives, also executes its maximum deflection if the polarities of the coils have been properly taken into account.

This arrangement was first tested out by placing the magnets on the outside of the prongs of a large 70-cycle tuning fork. The prongs of such a fork, when properly balanced, move in and out together, and hence it is very well suited for this test. When the coils were connected so that their voltages opposed each other no steady oscillations of the oscillograph element occurred, although there was a sudden deflection just as the fork was struck with a felt hammer. This, however, was due to the fact that the prong which was struck was suddenly driven away from one magnet while the other prong was still at rest. However, as soon as both prongs were vibrating the element remained almost completely at rest.

When the coils of the magnets were connected so that their effect was *additive*, a slight tap on one of the fork prongs was sufficient to give a steady oscillograph oscillation, which, of course, gradually decreased in amplitude with that of the fork.

Although the apparatus arranged in this manner was extremely sensitive, it failed utterly to record anything which could be identified as a torsional vibration.

This negative result in attempting to record torsional vibrations of the Springfield muzzle does not, of course, prove that torsional vibrations are not present. It does, however, indicate that such oscillations are rather small and probably of no consequence in comparison with the other sources of muzzle disturbance.

Nodes in the Springfield Barrel

Cranz and Koch determined the nodes of the Model 71 Mauser, as already explained, by fastening a strip of cardboard to the top of the barrel and covering it with a thin layer of sand or similar material. When the barrel was excited, either by firing or by tapping, the sand moved towards the points at which the disturbance was a minimum, that is to say, towards the nodes.

We do not recommend this method for two reasons: first, the nodes are not definitely depicted on account of the more or less violent motion of the barrel vibrating in its fundamental; and second, it necessitates cementing a strip to the barrel, which is certained not desirable on a barrel having a fine finish. The nodal position in the Springfield barrel was, however, measured by this method. The hand guard was removed and the upper band fastened at the front sight in order to permit the cardboard strip to be fastened along the top of the barrel. The lower band did not interfere when the hand guard had been removed. Measurements to the nearest centimeter were obtained as follows:

Shot	Approximate distance of nodal point of first overtone from muzzle
1	12 cms.
2	11
3	14
4	12
5	13
Mean	12.4 cms.

The nodal point may, however, be obtained without fastening strips and using sand or other material, which necessitates taking down the piece afterwards in order to clean it.

The following method does not necessitate such procedure and will not harm the finest target rifle in any way.

The barrel with the receiver was removed from the stock and clamped lightly between pieces of cardboard at the "fixed base." A number of No. 18 copper wires about three inches long were bent into "U"-shaped pieces or riders. These were hung over the barrel about ¾ inch apart from the front sight to the fixed base. By means of a felt hammer the barrel was now caused to vibrate by tapping lightly on the extreme rear of the receiver. When tapped lightly in this way the barrel vibrates principally in its fundamental and first overtone and the riders move towards the node. Care must be taken to strike lightly, otherwise the riders do not show so marked a tendency to stop at the node, due to the amplitude of the fundamental.

With this method we obtained three readings on the node of the first overtone, which could be read to the nearest millimeter as follows:

Trial	Distance of nodal point of first overtone from from muzzle
1	12.0 cms.
2	12.0
3	12.0
Mean	12.0 cms.

If this position is not greatly modified by too tight clamping of the barrel or other factors producing a strained condition, we see that the nodal point of the first overtone for the service Springfield is just at the back of the upper band or directly over the stacking swivel.

Vibrations of the Heavy Barrel Springfield Rifle, Cal. .30, in the Vertical Plane. International Serial No. 1266185

This rifle is shown in Fig. 28. Through the courtesy of Lt. Col. G. C. Shaw, Director of Civilian Marksmanship, we obtained one of the heavy-barrel match Springfield rifles. The point at which the motion was recorded was two inches from the muzzle.

Figs. 29 and 30 are records of the motion in a vertical plane of the heavy-barrel Springfield rifle firing the service cartridge with the 150-grain bullet. In each case the exit of the bullet occurred just beyond zero displacement and on an upward swing. Due to changes in the plate and filament batteries the amplification of the power amplifier is not the same from day to day, so that quantitative comparisons of the amplitudes of the various guns are not practicable. It will, however, be noted that, although the barrel of the heavy Springfield is considerably longer than the service arm, its vibrations are very much smaller.

Doubtless the accuracy of the old heavy barrel muzzle-loading rifles was due in large part to the rigidity of the barrel, which did not vibrate greatly prior to the exit of the bullet.

Vibration of the Heavy-barrel Springfield Rifle in a Horizontal Plane

In Figs. 31 and 32 are recorded the lateral motion of a point two inches back from the muzzle when firing the service charge. In

these films motion towards the timing lines corresponds to a left deflection of the muzzle as the piece is ordinarily fired from the shoulder. In this case, the muzzle is near the zero axis when the exit of the bullet occurs. The amplitude is, however, quite small in the case of the heavy barrel.

.45-70 Springfield Model 1873, 500-Grain Bullet. Vertical Plane

This rifle is shown in Fig. 33. In Fig. 34 is shown the record of the vibrations in a vertical plane of a point two inches back from the muzzle of a Model 1873, .45-70 Springfield. The disturbances are vastly greater, of course, than those of the "match" barrel. The time of fall of the large hammer, equal to about 0.0085 second, is considerably longer than the 0.006 second for the average time of fall of the Service Springfield striker.

In this, as in many of the other muzzle vibration records, the muzzle is subject to many transient tremors of very high frequency. It seems, however, that the exit of the bullet occurred near the zero axis on a downward swing.

It will be evident that this motion of the muzzle is hardly "parallel to the axis of the bore," as stated by Crehore and Squire. The fact that a barrel vibrates does not of course necessarily mean that it will not shoot accurately. For if loaded with uniform ammunition the bullet exit occurs near the same portion of the cycle for each shot after one or two charges have been fired. The particular .45-70 Springfield in question is a remarkably accurate rifle.

Lateral Vibrations of the Model 1873 Springfield

Fig. 35 is the record of the lateral motion of a point two inches back from the muzzle of the .45-70 Springfield firing the 500-grain bullet. The muzzle had executed many cycles before the exit of the bullet occurred.

On account of the very high frequency and large amplitude, the record is not sufficiently clear to enable us to determine the exact point of the cycle at which the exit occurred. It seems, however, that the exit occurred near the maximum of a swing to the right. The entire time during which the muzzle vibrations, due to the firing of the charge, actually exist at appreciable amplitudes does not exceed four or five-thousandths of a second for this rifle.

.30 Caliber Schuetzen Rifle. Vibrations in a Vertical Plane of a Point Two Inches Back From the Muzzle

Fig. 36 is a record of the motion of the barrel of a .30 caliber Schuetzen rifle, at a point two inches from the muzzle. (See Fig. 37.) This rifle was obtained through the courtesy of the Remington Arms Co. It has a breech action similar to the Martini and hence it is not convenient to record the instant at which the striker starts to fall.

It will be seen that the barrel vibrates very little before the exit of the bullet. The frequency of approximately 4,000 cycles per second is due to the element as previously noted.

Just after the bullet clears the muzzle some comparatively violent oscillations occur.

Vibrations in a Horizontal Plane of a Point Two Inches Back From the Muzzle

Fig. 38 is a record of the lateral motion of the muzzle of the Schuetzen rifle.

Here some comparatively large vibrations occur prior to the exit of the projectile. These oscillations appear to consist mostly of higher overtones of the barrel. Still larger vibrations occur after the exit of the projectile.

Sharp's .52 Caliber Carbine

Sharp's rifles and carbines, invented by Christian Sharp about 1848, were among the first successful breech-loaders and the breech action was perhaps one of the safest ever devised. Colonel Berdan's regiment of sharpshooters were armed with the Sharp rifle during the latter portion of their service in the Army of the Potomac. We have included this old carbine in our experiments because we believe that many of these arms of a bygone day are still of great interest to those of us who are more or less familiar with them.

In Fig. 39 is shown a Sharp's carbine, Model of 1863, of .52 caliber, such as issued to cavalry during the Civil War. This carbine used a linen or paper cartridge and was fired with a percussion cap. The breech block drops straight down for the insertion of the cartridge and when the lever is pulled up again the front edge of the breech block cuts off the back of the cartridge, thus exposing the powder for ignition by the percussion cap.

The rifling in this particular arm is in excellent condition and does not contain a speck of rust. Since fresh cartridges were not available, we have made our own, using a charge of 5.5 grams or 85 grains of du Pont Fg. powder and the regular .52 caliber conical ball weighing 28.8 grams or 445 grains. This load gives very uniform velocities equal to 980 ft./sec. over the first 11.6 feet from the muzzle. The muzzle energy is therefore approximately 950 ft. lbs. This is greater than the 840 ft. lbs. of the ".35 Winchester Self-loading Rifle, Smokeless" and only slightly less than the 990 ft. lbs. of the ".38-55 Winchester, Marlin and Savage, Black and Smokeless Powder."*

The shocking power of such a large soft lead bullet would, however, be much greater than a comparison with modern jacketed bullets of equal muzzle energy would lead one to expect, if ability to do work were alone considered. For, while a jacketed bullet might have the same muzzle energy and therefore be capable of doing an equal amount of work, the resistance offered to it is much less than to the soft lead bullet. Hence, the jacketed bullet might pass clear through the target and emerge with a considerable portion of its energy, but if the heavy lead bullet encountered resistance, due to upsetting, etc., sufficient to stop it in the target, it is evident that the shock would be far greater than that due to the jacketed ball.

The fundamental frequency of the barrel, determined experimentally, was 71 cycles per second as compared with 61 cycles per second for the .30 cal. Service Springfield.

Vibrations in a Vertical Plane. Fig. 40 shows the record of the vertical motion of a point one inch back from the muzzle of the .52 cal. Sharp carbine. On this record there are also recorded the data for determining the average velocity over the first 11.6 feet of its range.

A wire screen was placed 11.6 feet from the muzzle and the bullet on passing through this screen cut one or two of the wires, thus breaking an electrical circuit. It was convenient to register this break by means of the same oscillograph element which indicates the falling of the striker and the bullet exit. This third break is recorded at δ. It will be seen that the number of timing intervals between this break and that occurring at the exit of the bullet is approixmately 12.2, and this corresponds to a time interval of .118 seconds since the frequency of the timing fork already given is 1,036.8 vibrations per second. Hence, the average velocity over the first 11.6 feet of the range is 980 ft./sec., approximately.

It will be noted that nearly 14 thousandths of a second elapses between the start of the hammer and the exit of the bullet as opposed to a little less than 7 thousandths for the Springfield. The muzzle has executed several swings of rather large amplitude before the exit of the projectile occurs. It appears that the muzzle was on a downward swing, having just passed through a maximum displacement when the bullet left the muzzle.

Very slight disturbances are seen just as the hammer is released.

Vibrations in a Horizontal Plane. Fig. 41 shows the record of the lateral vibrations of the muzzle of the Sharp's carbine. The break, which usually occurs at the start of the hammer, failed to function in this film. Comparatively speaking, there are fewer oscillations of the barrel of the Sharp's carbine in a horizontal plane than there are in the vertical plane.

Factors Influencing the Vibration of Rifle Barrels

The problems of the design of rifles in general has received a great deal of attention and many excellent arms have been produced as a result. The designer of a target rifle has, on the whole, an easier time of it than one who strives to develop the best service arm of this type. The military rifle must be light, not too long for work in trenches and for snap shooting; it must have a minimum number of parts, and these must be rugged and require little attention other than the requisite cleaning. The tolerances must be such that jams will not result when moderate quantities of sand and other foreign matter get into the action. In actual service, arms are sometimes covered with mud and rust, without opportunity being afforded to remove either. Add to this the necessity for accu-

* These comparisons are taken from the Remington Catalogue No. 107.

racy as exemplified in the Springfield rifle, and it is clear that the problem is indeed a difficult one.

These and a host of similar possibilities must be kept constantly in mind by the designer of a service rifle. On the other hand, the designer of a target rifle is under no such restraints and everything may be made subservient to accuracy. A fast breech action is here often of little importance, and almost any weight of barrel is countenanced.

We find the following interesting quotation in the British text book of small arms for 1909:

"In designing a new rifle endeavor should be made to so arrange the length of the barrel, the strength and weight of the parts, the method by which the recoil of the barrel and body is communicated to the stock, so that the barrel is in the middle of an upward vibration when a bullet with normal velocity leaves the muzzle; for then a bullet with higher velocity will leave the muzzle when it is pointing lower; and a similar compensation to that which occurs in the Lee-Enfield rifle will take place."

We cannot altogether agree with these views. In general a service rifle is intended to use one standard cartridge and the slight increase or decrease in range resulting from a muzzle being on an upward or downward swing is not a controlling factor. It is our opinion, therefore, that it would be well to take advantage of our knowledge of the phenomena to increase the accuracy of the arm rather than attempt to compensate for various loads. To obtain the greatest accuracy, other things being equal, the bullet should, of course, leave the muzzle at the same point of its swing on every shot. Because a rifle may shoot high or low does not by any means indicate that it does not shoot accurately, and therefore if the bullet were to leave at the top of an upward swing of the muzzle not only would the range be a maximum, but also the accuracy in so far as muzzle vibrations are concerned. The reason for this is that each extreme position is a turning point where the direction of motion is reversed and consequently the muzzle must come to rest twice in each cycle. Obviously its speed is a minimum while in the vicinity of one of these turning points and of course its speed is a maximum when crossing the mid-point; that is to say, the axis of the undistorted barrel. It will be readily seen that if other things are equal a small time error in the exit of the bullet will have the least effect when the motion of the muzzle is the slowest. If, for instance, the cartridges are loaded to give a bullet exit at the top of the first upward swing, then a bullet with a slightly higher velocity will leave the muzzle just before it reaches the peak of the curve, and a bullet moving a little slower will leave the muzzle just after it has started down from the peak. In either case the vertical component or swing error is very near zero. To make such an adjustment for any rifle, we need only try several different loads, barels, etc., and observe the muzzle behavior with our recording apparatus. By consulting the record thus obtained it will be evident which of the modifications used give a performance nearest that desired, and we may then interpolate accordingly.

A great many factors are frequently mentioned as contributing to erratic shooting of rifles in general. Among these may be mentioned a poor thread on the breech of the barrel resulting in a strained condition when the barrel is screwed into the receiver, and lugs improperly fitted so that one takes a considerable portion of the strain before the other begins to bear.

Variation in the size of the bullet varies the friction in the bore and consequently the excitation due to this cause. Metallic fouling produces a similar result, and erosion as it proceeds through a period of several years will also vary the friction between the projectile and the bore, other factors remaining unchanged.

A light coating of oil in the bore of the particular Springfield. used in these experiments, causes the bullet to leave at a lower point of the first portion of the cycle, and hence to shoot lower than in the case of a dry barrel. See Fig. 19.

Once the proper type of powder and bullet have been determined they should be adhered to. A charge of powder which burns either slower or faster, although giving the same muzzle velocity, might greatly change the observed phenomena.

Conclusions

1. The errors produced by barrel vibration are due to the fact that the projectile exit does not occur at exactly the same portion of the cycle from shot to shot. If the average exit occurs near the zero axis then the transverse velocity is a maximum and the slightest variations due to powder, projectile or dirt in the bore may conceivably cause the exit to occur slightly earlier or later than usual and consequently may cause comparatively large errors at the target.

In selecting barrels for the matches by firing them in machine rests some are found to be considerably better than others, although apparently identical. Possibly this slight superiority of some is due to the projectile exit occurring more nearly at one of the extremities of the swing where the variations due to transverse velocity are a minimum.

2. If a projectile exit at either end of the swing is equally accurate, then it would seem to be desirable to select the upper one, since in this case a slight increase in range would also be secured.

3. The time and position of the projectile exit may be controlled either by modifying the cartridge, the barrel or both.

4. In applying the apparatus, referred to in this paper, to actual routine work a camera capable of two or three times the film speed of the present one should be designed in order that the positions of the muzzle at the instant of the projectile exit could be determined precisely. In this way modifications in either barrel or cartridge components could be made by very small increments until the desired performance was obtained.

It seems reasonable to suppose that investigations such as those described in this paper would, if carried out in connection with actual firing on the range, produce some very interesting and valuable results.

The writer is indebted to Dr. E. Buckingham for suggestions regarding the mode of presentation of the material in this paper, and to Mr. H. D. Bruce for his kindly interest in the experiments and for reading the manuscript and proof.

PISTOL REGULATION

By Rev. S. W. Bryan,
Minister M. E. Church, Clairton, Pa.

IN ANY legislation aimed at pistol regulation, it will be a most unfortunate thing if it is made hard or next to impossible for American citizens to own pistols for target practice or for self-defense, in case of necessity. To assume that a man with a revolver has it for the sole purpose of killing another human being is certainly an unjust as well as an unwarranted assumption. No firearm was ever the direct cause of killing a person. Crime lies deeper than any weapon by which it is committed. To disarm American citizens while lawless men are literally swarming over the country would be to surrender to them the last line of defense, and to confess that they hold the balance of power. It would be doing a weak and foolish thing by bowing to the criminal class and making their business as safe as running an Old Folks' Home. To enact a law of this kind would be doing something that would absolutely amount to nothing in the way of preventing crime. While, on the other hand, it would make good men helpless in the presence of lawless men. When gangsters can use machine guns and carry on a warfare of their own in some of the largest cities of our country, and in defiance of the law and of the officers sworn to enforce the laws against criminals, what will happen when Americans are disarmed? No law on earth can prevent thugs and robbers from obtaining guns and ammunition. They will get what they need by airplane. They will make them. They will take them from the police in the same way that they rob banks and men with payrolls.

The automobile is the greatest aid to criminals that was ever invented by man. Why not enact a law that will prevent criminals from owning them? Because such a law, like one against owning pistols, could never be enforced with a shadown of success. Let the cities that are too weak to control the gangsters be placed under martial law, with regular troops, and round up the criminals, jail them, and wipe out their headquarters, and keepthem closed by the strong hand of the army. Law enforced is our only safety. But don't render Americans helpless in the face of daily danger to themselves and their families.

Random Incidents of the Scatter Gun

By Nash Buckingham

SEVERAL seasons ago I went to a Mississippi duck club in the delta below my home in Memphis, Tennessee, taking with me a solid liver-colored pointer dog named "Ticket." It was my idea, in case the flight proved no good, to hunt quail in the new ground and bottom land adjacent to the club. And admirable bird territory it is to this good day. As it turned out, I was in my blind by sunup next morning and at eight o'clock I finished my limit of twenty-five birds, every one of them a fine Mallard. I paddled back to the club house, changed to hunting boots from waders, whistled for Ticket, and set out across the railroad track into some new ground. Almost within one hundred yards of the right-of-way, Ticket pointed a bevy of birds, but they flushed wild on him just as I was coming up. I was using an automatic shotgun and fired three shots at them, bagging, however, only one bird.

The Ol' Scattergun brings 'em down

The singles flew through the woods and lit apparently in the edge of a corn field beyond. I followed them post-haste. Dragging through a bramble hedge which girdled the corn field, I found Ticket on a staunch point some thirty yards ahead. Off to one side, two negroes were pulling corn and loading it into a wagon. I walked up behind Ticket and flushed the quail, which circled out to my left. I killed the bird and Ticket retrieved it. Just as he handed it to me, out in front, from a marshy spot in the corn field, up flew a snipe. Standing at exactly the same spot at which I had killed the quail, I shot down the snipe, and Ticket in turn retrieved him. When he returned with the snipe, I happened to look down and saw that my automatic gun, having ejected the last load, was standing wide open, I having forgotten to put in any more shells when I fired the first three. I took out a shell, dropped it into the barrel, and touched the spring which closes the aperture. It fell with a loud clank. When it did so, off to my left some thirty yards, in a little pond of water among the brambles and corn, a green-headed Mallard flushed and began to climb above the foliage. I dropped him and Ticket made a very nice retrieve. Thus, I had stood in my tracks and bagged in three shots, each of which flushed wild, three distinct species of game, a quail, a snipe, and a wild duck.

I have never known why that duck selected the spot he did. One of the negroes called and asked me what kind of a "little old bird" that second one was that I had killed. I told him a snipe, and he said to me, "Lord, Cap'n, if you want to kill them birds, just go up to the wet place out in the cotton field in front of my cabin and you can see them birds by hundreds!" Figuring that he had mistaken snipe for "kildees," I did not go at once to the place he mentioned, but kept on quail hunting. About noon, on my way to the club house, I found the spot he mentioned, and before I had walked out into it good, snipe began flushing from every direction. I walked around, jumping and shooting them or squatting silently among the weeds and letting them circle out over the field and back into the marsh. In not less than thirty minutes I had accumulated a federal limit of snipe.

On another occasion I went to the same club—as a matter of record, it was during the bitter cold winter of 1918. Next morning, looking out over the lake, I saw an open place across from the club house with quite a number of ducks in it. I got a duck boat, and walked out to where the water began, then launched the boat and paddled to the shore, putting to flight several hundred ducks that were in the open water. I did not put any decoys out, but simply shoved the boat back into the tulles and waited for the birds to return. As a matter of fact, they came back so fast that after killing fifteen I decided to wade ashore and see what I could find out in the field. Getting out onto the lake bank, which was covered with an inch or two of snow that had fallen during the night, I saw a big swamp rabbit, or "cane cutter," as the negroes call them, so, being particularly fond of fried rabbit, I took him along. A little way up the bank I met a little colored boy with his dog. He said that he had just scared up some "quails," and pointed out to me a low thicket in the cotton field.

I went down there, kicked around in the grass, and eventually bagged eight quail, scattered along it for a hundred yards. Renewing my stroll up the lake bank, I ran two big squirrels up a tall pecan tree and added them to the bag. Further along, I came to an inlet off the lake. The water here was very low and the marshy ooze was covered with a rank growth. It was literally loaded with snipe. I found by experiment that it was dangerous to wade it, so all I could do was to wait until some of the "long bills" crossed my territory in their flight, and I eventually managed to garner seven of them. Then I tramped back to my boat, found the water covered with birds, scared them out and inside of thirty minutes I had the ten required to fill my limit of twenty-five.

A dog, a gun and fair shooting

With this strange assortment I made my way back to the club house, and the old negro mammy, Aunt Molly, presented me with a fresh ham and two pounds of country sausage. All in all I would call that a pretty good day's bag.

"MAN EATERS OF TSAVO."

(*Continued from page* 16)

were on the menu of the man-eaters so often that the construction work was held up.

Even as the pioneer railroaders of the United States had to chase the Indians off the right-of-way before they could push their steel westward, Col. Patterson was compelled to get rid of the man-eaters before he could continue his construction. It was a much more terrifying job than beating the Red Man. Indians were at least visible—they gave some notice of their presence. But the man-eating Lions of Tsavo were shadowy wraiths, killing their prey with instinctive certainty in the jungle blackness, while the hunter, blind and helpless in the dark, could not tell whether he was stalking the man-eater or the man-eater was stalking him. Col. Patterson has made no attempt at fine writing. He has told his story with the simple and modest directness of the soldier.

WILBUR COOPER.

Conducted by Lieut.-Col. G. C. Shaw

PROPERTY RETURNS AND REPORTS ON FIRING

BY THE time this is read by members, the forms for the Annual Return (Statement) of Government Property and the Annual Report of Firing will be in the hands of the secretaries of all of the Rifle Clubs. Any secretary not having received the forms by this time should write to the Director of Civilian Marksmanship, War Department, Washington, D. C., and ask for theirs, as they may have been lost in the mail, if not delivered.

This office is very anxious to have these reports sent in as soon as possible. The regulations under which the equipment was issued requires that these reports be made as of December 31 each year, and sent in within thirty days. If the required reports are not sent in, this office is required to call in the property issued. It is not desired to ask that the property be sent in, so everyone interested is urged to get the required reports in as soon as possible, and not later than February 1, in any event.

If the club has lost interest in firing and does not desire to keep the property, the reports should be made out anyway, and this office asked for shipping instructions to send in the stores. It has been found that when a club loses interest and does not send in the stores, that within a few months the stores become scattered and lost, and then they have to be paid for by the club, or by the individual who is principal on the bond. Oftentimes this expense can be saved by promptly asking for instructions for shipping the stores to an arsenal. When asked for, shipping instructions will be furnished by this office with the least delay practicable under the circumstances. Give this a thought when interest in shooting is lagging.

* * *

CAL. .22 SPRINGFIELD AVAILABLE

THE U. S. Rifle, cal. .22, model 1922 M1, is now available for sale to all N.R.A. members. Orders will be forwarded as soon as received in this office, and shipment should be made from Springfield Armory within a very few days thereafter. The price of this rifle is $46.00, plus $1.34 packing charges. Extra magazines, $1.85, one magazine only being furnished with the rifle. Any N.R.A. member wishing to purchase one of these rifles should send remittance in the proper amount to Director of Civilian Marksmanship, War Department, Washington, D. C.

CAL. .30 SPRINGFIELD WITH SPECIAL STOCK AVAILABLE

THERE is available a U. S. rifle, cal. .30, model 1903 (Springfield), with a pistol grip, Style NB stock. This rifle is of National Match grade throughout. The stock is of the military type with pistol grip and military type fore-end, service type butt and buttplate. This rifle in appearance, accuracy, and general utility is the equal of the National Match rifle, with the exception that it is equipped with the special stock instead of the service type stock. The price of this rifle is $45.50, plus $1.34 packing charges. Members of civilian rifle clubs may use this rifle in firing the qualification course for insignia. It may be used in any matches except in those where the rifle is specified "Service, as issued." This rifle should not be confused with the Springfield Sporter. Anyone desiring one of these rifles should forward proper remittance to the Director of Civilian Marksmanship.

* * *

SEND ORDERS TO PROPER PLACE

WHILE on the subject of remittances, it might be well to suggest that when ordering supplies from the Director of Civilian Marksmanship, that such orders be sent to this office and not to the N.R.A. The address of this office is Room 1635 Tempo Bldg., No. 5, 20th and C Sts., N. W., Washington, D. C., while the N.R.A. is 1108 Woodward Bldg., Washington, D. C. These two offices are in entirely different parts of the city, and when orders or remittances are sent to one, and meant for the other, it delays things for at least two days, and sometimes more.

The price list published by the N.R.A. for the benefit of all of its members shows exactly what supplies are sold through this office and what supplies are sold by the N.R.A. Service Co. Therefore all orders pertaining to that office should be sent there, and all orders pertaining to this office should be sent to the proper address. This applies as well to report required by this office, and to remittances for dues, personal and club, and any reports, targets, etc., being sent to the N.R.A. In a few words, send N.R.A. stuff to the N.R.A., and D.C.M. to this office. It will save time, delay, and quite a bit of unnecessary work on the part of each office if this request is heeded.

* * *

HEAVY BARRELED RIFLES AVAILABLE

A FEW U. S. Rifles, Model 1923, heavy-barrel International, are available for sale through this office. This rifle costs $85.00 plus $1.34 packing charges. It has the service action, heavy barrel, 28 or 30 inches in length, as desired, Style N.R.A. pistol grip stock without grasping grooves, and fitted with Model 1922 butt plate. It is equipped with the Lyman No. 48 C receiver sight, and the Winchester Globe front-sight. These rifles are not equipped with set triggers or palm rests. Such additional work will not be done at the Armory, but if desired by the purchaser, they must make arrangement to have the set-triggers and palm rests made by some concern engaged in making such equipment. This is the type of rifle used by the International Teams.

* * *

ENCLOSE MEMBERSHIP CARD

MEMBERS of the N.R.A. when ordering stores sold through the Director of Civilian Marksmanship will save delay and unnecessary annoyance by enclosing their membership card. These two offices, being in different parts of the city, it causes delay when it becomes necessary to check up to determine whether or not the purchaser is a member. The law, not regulations, says that sales of ordnance stores may be made to members of the N.R.A. It is up to the D.C.M. to be sure that the purchaser is a member of the N.R.A. before making a sale. So you can readily see how it will save delay to enclose your card. The card will be returned to you when the sale is made. Another thing to remember is to SIGN YOUR CARD. Otherwise this office must return it to you, as there is nothing to show the card to belong to you unless you sign it.

* * *

SEND REQUISITIONS EARLY

SECRETARIES of all clubs are requested to send in the requisition for the 1927 allowance of supplies as soon after January 1 as possible. Allowances for the clubs are figured for the calendar year now instead of for the fiscal year. Therefore the 1927 allowance is due the club any time after January 1, instead of after July 1. Just as soon as the required reports are in, and the National Rifle Association reports the club in good standing with regard to payment of dues, the requisition will be approved. So send in the requisition early, and in any case, not later than March 31.

* * *

SEND IN REPORT ON QUALIFICATION

QUITE a number of reports of qualification firing for record have been received recently. The insignia earned by various civilian shooters are being mailed to the club secretaries as fast as the reports can be checked. It is gratifying to note the increase in the number of these reports and also the number qualifying in the various clubs seems to be increasing. And the qualifications are getting higher also. Shows what practice will do. Quite a number of shooters are being issued re-qualification bars for their third qualification as Expert. Not so many being issued for the third re-qualification as Sharpshooter, for by the time that a shooter re-qualifies as Sharpshooter a couple of times, he generally breaks into the Expert class, and naturally he does not get any more badges or bars as Sharpshooter.

Conducted by C. B. Lister

Gallery Season Gets Under Way With Real Competition in All Events

WITH a total of 308 entries in the four rifle matches and 93 entries in the two pistol matches listed below, the Gallery Rifle and Pistol Matches, 1926-27 have gotten away to a start that has already established new records for "attendance." An interesting feature of these bulletins is the fact that more competitors are now taking part in the 50-ft. matches than in the 75-ft. Not so long ago a club was "out of luck" if it could not find space for a 75-ft. range. The introduction of the 50-ft. range was apparently a move in the right direction.

No shoot-offs have been necessary so far. the "x-ring" taking care of three possibles in the 50-ft. Tyro Match, 11 possibles in the 50-ft. Prone Championship, and four possibles in the 75-ft. Prone Championship. The wisdom of the new Gallery Targets, which will be introduced next year, with much smaller 10-rings, is apparent from the results in the 50-ft. Championship, where a possible was not good enough to win a medal.

The .22 Springfield drew first blood in the Gallery Matches when C. S. Luther, shooting the Springfield with Peters Tackhole, took high honors. T. R. Barnes, runner-up, used a Mod. 52 Winchester with U. S., N.R.A., and S. I. Kornhauser, whose possible placed him third, used a .52 Winchester with Remington Palma.

In the 75-ft. Prone Tyro the Winchester .52 had clear sailing, taking the first 9 places. Neill, the winner, used Precision ammunition, Taylor, runner-up, used U. S. N.R.A., and Wright and Elsner used Precision.

An old campaigner appeared in his warbonnet to take the bitterly contested 50-ft. Prone Championship. T. K. Lee, using a .52 Winchester, Fecker scope and Peters ammunition, achieved the ultimate with a straight run of "x's." Four men turned in 38 "x's," all using Mod. .52's. Golden, Lloyd, and Woolshlager used 5-A scope. Golden shot Peters ammunition, Lloyd used U. S., and Woolshlager Winchester. Sam Moore, the fourth member of the quartette, shot Winchester ammunition, looking through a Fecker scope.

This same Same Moore, the lad who was decorated by President Coolidge last spring for his world's record run on the Junior Rifle Corps target, captured the 75-ft. Prone Championship with a clean slate—40 "x's." Peterson, runner-up, used a Mod. .52, a 5-A scope, and Precision ammunition. Moore shot a Stevens with Fecker scope and U. S. N.R.A.

The Tyro Slow-Fire Pistol Match went to the West. L. W. Griffith, of Iowa, topping the field of 65 entrants with a total of 563, shooting a S. & W. single-shot pistol with Palma ammunition. Engert, runner-up, also used a S. & W., but placed his dependence on U. S. N.R.A. Elsner, finishing third, shot a Colt Auto with Precision 200. Engert and Griffith shot it out again in the rapid-fire match. The tables were turned, however, and the New Yorker switching to a Colt Officers' Model and handloaded ammunition, took top honors. Engelhart, finishing third, used a Colt Auto and Palma.

* * *

INDIVIDUAL PRONE MATCH AT 50 FEET

Name	*Address*	*Score*
T. K. Lee	Birmingham, Alabama	40x 400
C. C. Golden	Indianapolis, Ind.	38x 400
Same Moore	Ithaca, New York	38x 400
E. B. Lloyd	Elgin, Illinois	38x 400
J. F. Woolshlager	Castorland, N. Y.	38x 400
H. H. Chedester	Bentleyville, Pa.	37x 400
Emmet Swanson	Minneapolis, Minn.	35x 400
Joe Wilson	Sapulpa, Oklahoma	35x 400
V. J. Hadin	Schenectady, N. Y.	35x 400
Bruce Wilson	Sapulpa, Oklahoma	34x 400
Robert Patrick	Sapulpa, Okla.	33x 400
Lloyd O. Moore	New Cumberland, Ohio	399
G. L. Cutting	Worcetser, Mass.	399
Hary E. Brill	Tulsa, Okla.	399
Wm. McNamee	Jacksonville, Fla.	399
H. T. Noyes	New York City, N. Y.	399
F. C. Payne	Los Angeles, Calif.	399
O. T. D. Brandt	Seattle, Wash.	399
E. M. Farris	Portsmouth, Ohio	399
F. E. Passmore	Huntley, Ill.	399
Frank Yoran	Tarrytown, N. Y.	399
O. W. Keckonen	Calumet, Mich.	398
A. B. Sprague	Worcester, Mass.	398
Eldridge Adams	San Antonio, Texas	398
S. E. Johnson	Louisville, Ky.	398
Martin O'Connor	Racine, Wisconsin	398
G. C. Pierce	Holly Oak, Dela.	398
W. P. Dunbar	Culver, Indiana	398
H. W. Daniel	Sapulpa, Okla.	398
Morton Solomon	New York City, N. Y.	398
C. L. Venard	St. Joseph, Missouri	398
Alma Essex	College Park, Md.	398
Jim Bell	Sapulpa, Oklahoma	398
C. E. Reide	Hazelton, Iowa	397
H. C. Duke	Richwood, Ohio	397
Robert A. Weir	Hollywood, Calif.	397
L. W. Soegel	Elgin, Ill.	397
J. J. Ingalls	Aurora, Iowa	397
J. I. Cahalan	New York City, N. Y.	397
J. P. Brooks	Richwood, Ohio	397
Walter Kelsey	Tarrytown, N. Y.	397
T. G. Sager	Newburgh, N. Y.	396
G. A. Campbell	Tulsa, Okla.	396
J. O. Norcross	Worcester, Mass.	396
Fred Schneider	St. Louis, Mo.	396
W. A. Schwarz	Vancouver, Wash.	395
D. H. Nelson	Ontario, Calif.	395
A. A. Taylor	Brooklyn, N. Y.	395
E. E. Richoz	Elgin, Ill.	395
A. R. Peterson	Calumet, Mich.	395
C. D. Wild	Janesville, Iowa	395
M. M. Works	San Antonio, Texas	395
Richard Dunlap	Sapulpa, Okla.	394
Charles Wood	Tarrytown, N. Y.	394
Jim Barlow	Halstead, Kansas	394
C. E. Scofield	Ortonville, Minn.	394
L. W. Griffith	Independence, Iowa	394
G. W. Geenty	Ortonville, Minn.	394
C. J. Smith	St. Louis, Missouri	393
Arthur Strode	Vancouver, Wash.	393
W. G. Jones	Jacksonville, Fla.	392
Ray Blanchard	Evanston, Ill.	392
A. E. Hertzler	Halstead, Kansas	392
Ivan Whiting	Plymouth, Wisconsin	392
L. M. Buckner	Louisville, Ky.	391
C. H. Wilson	Ortega, Fla.	391
L. E. Bigelow	Jacksonville, Fla.	390
Walton Anderson	Gearhart, Oregon	390
J. E. Nau	Jacksonville, Fla.	388
Joseph Rizzi	Tarrytown, N. Y.	387
L. P. Clubine	Aurora, Iowa	387
Arthur Marriott	Richwood, Ohio	385
Paul Russell	Tarrytown, N. Y.	383
Carl Schmidt	Tarrytown, N. Y.	383
Sal Chillemi	Tarrytown, N. Y.	382
N. J. Fink	Ortonville, Minn.	379
Frank Walck	Tarrytown, N. Y.	378
W. G. Steed	Jacksonville, Fla.	373
Karl Friedrich	Ames, Iowa	359
Robert Thompson	Tarrytown, N. Y.	346
E. T. Strange	Hershey, Penna.	313

UNABLE TO FIRE

S. P. Gardner, Renovo, Penna.
F. M. Oyler, Erie, Penna.

NOT REPORTED

Martin Deely, Tarrytown, N. Y.
Frank Riley, Richwood, Ohio
L. H. Lapinske, Wausau, Wisconsin
E. H. Bucknell, Seattle, Wash.
J. D. McNabb, Los Angeles, Calif.
George Stumpf, Brookville, Indiana
Helen G. Boyerle, College Park, Md.
Donald Valentine, New York City, N. Y.
M. E. McManes, Piqua, Ohio
Eric Johnson, Ardmore, Okla.
N. A. Stanley, Cape Horn, Wash.
M. L. Robinson, Los Angeles, Calif.
W. B. Pape, Boston, Mass.
J. L. Behring, College Park, Md.
Clemencia Gause, College Park, Md.

INDIVIDUAL PRONE MATCH AT 75 FEET

Name	*Address*	*Score*
Same Moore	Ithaca, New York	40x 400
E. L. Peterson	Windber, Penna.	37x 400
E. N. Moor, Jr.	San Francisco, Calif.	33x 400
L. M. Felt	Chicago, Ill.	31x 400
O. T. D. Brandt	Seattle, Wash.	35x 399
W. H. Schulz	Cleveland, Ohio	30x 399
J. R. Satava	Cleveland, Ohio	29x 399
E. A. Barnard	Brattleboro, Vt.	29x 399
W. Beale	Wala Walla, Wash.	28x 399
H. H. Jacobs	Dayton, Ohio	27x 399
G. A. Lindgren	Chicago, Ill.	26x 399
T. L. Albee	LeGrange, Ill.	25x 399
C. E. Scofield	Ortonville, Minn.	18x 399
H. M. Van Steen	Gastonia, North Carolina	398
H. C. Wright	Fresno, Calif.	398
Wm. Probert	Steubenville, Ohio	398
A. P. Danforth	Arlington, Mass.	398
W. M. Hire	Castalia, Ohio	398
F. D. Wheeler	Chicago, Ill.	397
C. L. Vonard	St. Joseph, Mo.	397
S. C. Williams	Oakland, Calif.	397
R. B. Greig	Oak Park, Ill.	397
A. S. Dempsie	Seaside, Oregon	397
W. R. O'Neill	Steubenville, Ohio	397
L. F. Taylor	Fresno, Calif.	397
Bruce Wilson	Sapulpa, Okla.	396
Harold Hubele	St. Louis, Mo.	396
Joe Wilson	Sapulpa, Okla.	396
A. B. Jordan	Brattleboro, Vt.	396
C. W. Randall	Alameda, Calif.	396
C. R. Strong	Ardmore, Penna.	396
T. T. McClure	Santa Monica, Calif.	396
H. H. Chedester	Bentleyville, Penna.	396
L. A. Pope	Los Angeles, Calif.	395
G. W. Geenty	Ortonville, Minn.	395
Martin O'Connor	Racine, Wisconsin	394
Robert Neill	Venice, Ohio	394
J. B. Currier	Glendale, Calif.	394
R. B. O'Neill	Steubenville, Ohio	393
R. J. Freize	Gastonia, N. C.	393
C. M. Stockman	Bedford, Ohio	393
E. H. LaRue	Chicago, Ill.	393
Fred Johansen	Joliet, Ill.	393
Robert A. Weir	Hollywood, Calif.	393
P. W. Lahme	Boston, Mass.	393
Hubert S. Miller	Cincinnati, Ohio	392
A. A. Taylor	Brooklyn, New York	392
I. L. Wade	Boston, Mass.	392
Orlen Royce	Seaside, Oregon	392
J. E. Young	Ft. Benj. Harrison, Ind.	392
J. S. Finlay	Chicago, Ill.	392
A. U. Abbott	Seaside, Oregon	392
Harry T. Craig	Lawrence, Kansas	391
C. H. Kleist	St. Louis, Mo.	391
R. O. Eisenlohr	Dayton, Ohio	391
Herge Johnson	Joliet, Ill.	390
B. G. Betke	Boston, Mass.	390
H. J. Collins	Boston, Mass.	390
W. L. Stephens	Moore, Penna.	390
O. W. Keckonen	Calumet, Mich.	389
O. H. Wheeler	Boston, Mass.	388
G. Bonglia	Boston, Mass.	388
P. T. Ciapp	Brattleboro, Vt.	387
C. L. Lind	Boston, Mass.	386
D. L. Ford	Boston, Mass.	386
N. J. Fink	Ortonville, Minn.	383
G. A. Hughes	Youngstown, Ohio	382
R. E. Eiselohr	Dayton, Ohio	382
E. O. Loring	Chicago, Ill.	380
Howard R. Loy	Lawrence, Kansas	380
William H. Gould	West Toledo, Ohio	379
C. D. Dahlene	Lawrence, Kansas	375
C. O. LaMoria	Boston, Mass.	372
Lester J. Reber	Lawrence, Kansas	365

UNABLE TO FIRE

Stanley P. Gardner, Renovo, Penna.
Wallace L. Darling, Boston, Mass.

NOT REPORTED

G. Titherington, Stockton, Calif.
E. H. Bucknell, Seattle, Wash.
F. P. Studholme, Portland, Oregon
B. A. Courtright, Wilkes-Barre, Penna.
Eric Johnson, Ardmore, Oklahoma
M. E. McManes, Piqua, Ohio
Forest J. Fleming, Fresno, Calif.
Sydnor Hall, St. Louis, Missouri
H. A. Weymouth, Salt Lake City, Utah
F. W. Parker, Jr., Chicago, Illinois

TYRO SLOW-FIRE PISTOL MATCH

Name	Address	Score
L. W. Griffith,	Independence, Iowa	563
J. F. Engert,	Herkimer, New York	534
Albert H. Elsner,	Toledo, Ohio	529
E. Mannie, St.	Louis, Missouri	528
M. C. Corrinet,	Pittsfield, Mass.	527
F. E. Whipple,	Milton Park, Mass.	521
L. J. Newell,	Portland, Oregon	498
W. A. Schwarz,	Vancouver, Wash.	495
E. F. Bareis,	Cumberland, Maryland	495
George M. Burch,	Portland, Oregon	495
E. B. Lloyd,	Elgin, Illinois	493
S. J. Mansfield,	Tucson, Arizona	492
E. C. Engiehart,	Ferguson, Missouri	492
G. A. Hughes,	Youngstown, Ohio	491
C. P. Beales, N.	Kansas City, Missouri	488
M. M. Works,	San Antonio, Texas	485
R. J. Freize,	Gastonia, North Carolina	484
H. M. Wolfe, Jr.,	Palmerton, Penna.	483
M. T. Konkright,	Des Moines, Iowa	478
Clarence J. Smith, St.	Louis, Missouri	478
H. G. Keene,	West Medford, Mass.	477
G. A. Raab,	Portland, Oregon	476
Lee W. Seigel,	Elgin, Illinois	475
William Eberwine,	Sacramento, Calif.	473
O. H. Klein,	New York City, N. Y.	473
Kenneth W. Wright,	Chanute, Kansas	471
William H. Riddle,	Seaside, Oregon	469
L. P. Krehbiel,	Halstead, Kansas	466
L. M. Reihsen,	Ontario, Calif.	462
F. Hegenbarth, St.	Louis, Missouri	461
M. Sykalle,	Tucson, Arizona	459
Horace P. Shaw,	Birmingham, Michigan	458
R. O. Eisenlohr,	Dayton, Ohio	457
E. E. Christofferson,	Vancouver, Wash.	450
R. M. Bair,	Hummelstown, Penna.	446
A. W. Anderson,	Hollis, L. I., N. Y.	446
V. E. Hornston,	Moulton, Iowa	433
A. B. Sprague,	Worcester, Mass.	429
Walter A. Grear,	Cleveland, Ohio	425
Giles J. Mundy,	Toledo, Ohio	407
William H. Boynton,	Berkeley, Calif.	396
R. E. Eisenlohr,	Dayton, Ohio	384
Joseph J. Mullin,	Brooklyn, N. Y.	358
Irma D. Dunbar,	Culver, Indiana	345
Robert Kitchell,	Des Moines, Iowa	259
R. O. Blakeslee,	Omaha, Nebr.	167

UNABLE TO FIRE

Norman Sterrett, Beaver Falls, Penna.

NOT REPORTED

W. B. Pape, Boston, Mass.
C. E. Sayre, Norfolk, Nebraska
W. E. Sheehan, Portland, Oregon
Frank D. Montague, Towanda, Penna.
T. T. McClure, Santa Monica, Calif.
F. S. Ambrose, Fairmont, West Virginia
Dr. Comprill, Halstead, Kansas
C. H. Wilson, Ortega, Florida
W. G. Chaney, Philadelyphia, Penna.
J. H. McAlpin, Omaha, Nebraska
F. E. Passmore, Huntley, Ill.
E. J. Barnes, Towanda, Penna.
H. A. Weymouth, Salt Lake City, Utah
Claud Wilson, Fairmont, West Virginia
G. A. Hughes, Youngstown, Ohio
Milford Baker, Philadelphia, Penna.
W. G. Jones, Jacksonville, Florida
L. J. Brice, Walla Walla, Wash.

TYRO RAPID-FIRE PISTOL MATCH

Name	Address	Score
J. Fred Engert,	Herkimer, New York	518
L. W. Griffith,	Independence, Iowa	508
E. Carl Engelhart,	Ferguson, Missouri	476
Albert H. Elsner,	Toledo, Ohio	449
S. W. Kirakoff,	Rendondo Beach, Calif.	444
G. A. Hughes,	Youngstown, Ohio	441
V. E. Hornsten,	Moulton, Iowa	439
L. P. Krehbiel,	Halstead, Kansas	432
M. M. Works,	San Antonio, Texas	432
William H. Riddle,	Seaside, Oregon	382
O. H. Klein,	New York City, N. Y.	372
Walter A. Greer,	Cleveland, Ohio	368
Kenneth W. Wright,	Chanute, Kansas	356

UNABLE TO FIRE

Norman Sterrett, Beaver Falls, Penna.

NOT REPORTED

William H. Boynton, Berkeley, Calif.
Milford Baker, Philadelphia, Penna.
F. Hegenbarth, St. Louis, Missouri
Dr. Comprill, Halstead, Kansas
E. J. Barnes, Towanda, Penna.
H. A. Weymouth, Salt Lake City, Utah
K. G. Chaney, Philadelphia, Penna.
W. G. Jones, Jacksonville, Florida
C. H. Wilson, Ortega, Florida
W. B. Pape, Boston, Mass.
G. A. Hughes, Youngstown, Ohio
Frank D. Montayne, Towanda, Penna.
A. W. Anderson, Hollis, L. I., N. Y.
H. M. Wolfe, Jr., Palmerton, Penna.

PRONE TYRO MATCH AT 50 FEET

Name	Address	Score
C. S. Luther,	Columbia, Missouri	31x400
T. R. Barnes,	Stanford, California	30x400
S. I. Kornhauser,	Louisville, Ky.	29x400
G. M. Davis,	Blacksburg, Virginia	399
M. Sykalle,	Tucson, Arizona	398
K. W. Wright,	Chanute, Kansas	398
G. Edmondson,	Columbia, Missouri	398

NATIONAL MATCH TRYOUTS ASKED

GEN. M. A. RECKORD, executive vice-president of the N.R.A., has requested the Secretary of War to hold tryouts for the selection of the members of the International team. He has requested that such tryouts be held in each corps area, so that the team may be selected from the best marksmen of the entire country. Although no reply has, as yet, come from the Secretary of War, it is hoped that such tryouts will be held in the following places:

First Corps Area—Camp Devins; Second Corps Area—Fort du Pont, Fort Niagara; Third Corps Area—Camp Meade, Fort Eustis; Fourth Corps Area—Fort Screven; Fifth Corps Area—Camp Knox, Fort Hayes, Fort Benjamin Harrison; Sixth Corps Area—Camp Custer, Fort Sheridan; Seventh Corps Area—Fort Snelling, Fort Omaha, Fort Des Moines; Eighth Corps Area—Fort Sam Houston, Fort Logan; Ninth Corps Area— Fort Barry, Fort Missoula, Fort Lawton, Fort Douglas, Fort Rosecranz, Camp Lewis.

General Reckord has further urged that, although weather conditions will be far from ideal, wind breaks be constructed, and that further arrangements be made to provide competitors with mess and shelter.

Any citizen of the United States may enter the competition for a place on the international team if the Secretary of War will authorize the tryouts. The conditions of fire and the course follow:

All firing on international 300-meter target as issued, distance, 300 yards. Any metallic sights and any ammunition. Any rifle. Positions: Standing, body supported by legs only, palm rest permitted; kneeling, cushion permitted under leg, provided knee and foot touch ground; prone, regulation prone position, forearms free of ground or other artifical support; ten shots prone, twenty shots kneeling, thirty shots standing; five sighters in each position optional.

The winner of each tryout will receive a silver medal. Second and third will receive bronze medals, regardless of whether they finally make the team or not.

J. V. Crawford,	Stanford, Calif.	398
D. C. Golden,	Kirklyn, Penna.	398
M. M. Works,	San Antonio, Texas	397
L. P. Clubine,	Aurora, Iowa	397
C. D. Chubbuck,	Stanford, Calif.	397
V. J. Huff,	Racine, Wisconsin	397
G. A. Foxall,	Beaver Falls, Penna.	396
J. J. Ingalls,	Aurora, Iowa	396
John Thiess,	Cincinnati, Ohio	396
D. D. Mercer,	Llanerch, Penna.	396
L. B. Weymouth,	Stanford, Calif.	396
W. Beale,	Walla Walla, Wash.	396
C. H. Wilson,	Ortega, Florida	395
Charles Smith,	Beaver Falls, Penna.	395
Norman Hawkins,	Columbia, Missouri	395
Jim Bell,	Sapulpa, Oklahoma	395
Lloyd Ludwig,	Beaver Falls, Penna.	395
Ray Lackner,	Beaver Fals, Penna.	395
Frank E. Smith,	Tulsa, Oklahoma	395
Edmund Snyder,	Columbia, Missouri	394
J. C. Baker,	Cincinnati, Ohio	394
J. B. Donnelly,	Cincinnati, Ohio	394
J. H. McAlpin,	Omaha, Nebraska	394
A. G. Sidenblad,	Morris, Minnesota	393
J. R. Foster,	Columbia, Missouri	393
J. M. Brown,	Cincinnati, Ohio	393
C. O. Thompson,	Stanford, Calif.	393
Loren Trabert,	Evanston, Illinois	393
W. I. Toms,	Chicago, Illinois	392
Ivan Whiting,	Plymouth, Wisconsin	392
L. Nicholson,	Cincinnati, Ohio	392
T. Rushmore,	Cincinnati, Ohio	392
B. F. Ederer,	Morris, Minnesota	392
V. E. Hornsten,	Moulton, Iowa	392
Charles Wood,	Tarrytown, N. Y.	391
D. B. Satchell,	Cincinnati, Ohio	391
L. M. Reihsen,	Ontario, Calif.	391
C. D. Aiken,	Blacksburg, Virginia	391
F. C. Wood, Jr.,	New York City, N. Y.	391
J. H. Kucera,	Blacksburg, Virginia	391
G. B. Greene,	Lansing, Michigan	391
A. M. Allen,	Sapulpa, Oklahoma	390
L. P. Krehbiel,	Halstead, Kansas	390

NOT REPORTED

W. A. H. Ely, Tarrytown, New York
Howard Schenk, Tarrytown, New York
B. A. Thompson, Tarrytown, New York
A. L. Fricks, Jacksonville, Florida
Irwin E. Stoll, Ann Arbor, Michigan
J. D. McNabb, Los Angeles, Calif.
L. H. Lapmiske, Wausau, Wisconsin
Charles Croke, Tarrytown, New York
George Bertey, Tarrytown, New York
Haywood Parker, Chapel Hill, North Carolina
R. L. Albrook, Aurora, Iowa
P. T. Washburn, Brooklyn, New York
W. B. Pape, Boston, Mass.
Martin Deely, Tarrytown, New York

PRONE TYRO MATCH AT 75 FEET

Name	Address	Score
Robert Neill,	Venice, Ohio	396
L. F. Taylor,	Fresno, Calif.	395
K. W. Wright,	Chanute, Kansas	395
A. H. Elsner,	Toledo, Ohio	394
W. G. Moody,	Fresno, Calif.	394
W. H. Schultz,	Cleveland, Ohio	394
V. J. Huff,	Racine, Wisconsin	392
H. W. Daniel,	Sapulpa, Okla.	392
C. L. Lind,	Boston, Mass.	392
T. T. McClure,	Santa Monica, Calif.	392
W. H. Gould,	West Toledo, Ohio	392
I. L. Wade,	Boston, Mass.	391
D. C. Golden,	Kirklyn, Penna.	391
R. F. Hatfield,	Chicago, Illinois	391
R. R. Crawford,	Fresno, Calif.	390
G. Bonglia,	Boston, Mass.	389
C. A. DuNah,	Pasadena, Calif.	389
E. Mannie, St.	Louis, Missouri	389
O. H. Wheeler,	Boston, Mass.	388
C. M. Stockman,	Bedford, Ohio	388
D. L. Ford,	Boston, Mass.	387
A. S. Dempsie,	Seaside, Oregon	387
W. L. Stephens,	Moore, Penna.	387
S. H. McGinnes,	Brewster, Ohio	386
M. Sykalle,	Tucson, Arizona	386
C. H. Kleist, St.	Louis, Missouri	385
C. P. Beals, No.	Kansas City, Missouri	384
E. O. Loring,	Chicago, Illinois	384
J. P. Nielsen,	Elk Horn, Iowa	383
J. S. Finlay,	Chicago, Illinois	382
C. C. Jahnke,	Barrington, Illinois	382
G. P. Mosley,	Llanerch, Penna.	380
Harold Hubele, St.	Louis, Missouri	380
N. J. Fink,	Ortonville, Minn.	377
S. J. Mansfield,	Tucson, Arizona	375
H. F. Johansen,	Chicago, Illinois	374
H. Christensen,	Elk Horn, Iowa	373
J. Jacobson,	Elk Horn, Iowa	367
C. H. Balfour,	Chicago, Illinois	364
K. B. Jones,	Chanute, Kansas	363
F. G. Reimers,	Paullina, Iowa	360
George Esbeck,	Elk Horn, Iowa	357
Fred Sorensen,	Elk Horn, Iowa	355
P. E. James,	Elk Horn, Iowa	340

NOT COMPLETED OR NOT REPORTED

S. P. Gardner, Renovo, Penna.
R. O. Eisenlohr, Dayton, Ohio
R. B. Baker, Chicago, Illinois
Sydnor Hall, St. Louis, Missouri
B. A. Courtright, Wilkes-Barre, Pa.
G. A. Staniar, Belleville, N. J.
R. E. Eisenlohr, Dayton, Ohio
C. O. LaMoria, Boston, Mass.
E. W. Bradow, Chicago, Illinois
J. E. Greer, Allston, Mass.
E. L. Peterson, Windber, Penna.
Forest J. Fleming, Fresno, Calif.
W. B. Metzger, East Orange, N. J.

(A Unit of the National Rifle Association devoted to teaching every boy and girl in America the safe and accurate handling of the rifle.)

Conducted by H. H. Goebel

Every Shot a Bullseye

Closer Cooperation With Boys and Girls Organization.

"RING out the old, ring in the new!" We have taken down the 1926 target and have placed the 1927 target on a backstop of a tried and sound policy with a program of individual qualifications and matches enlarged to five bullseye proportions.

We are glad to report that every shot fired during the year closing our first anniversary as the N.R.A. Junior Rifle Corps has been a bullseye. It has been no little task to set up a new home organization, standardize policies, and to "hit where we aimed" in all instances. We have come out on top and it is with genuine satisfaction that we set aside this issue as a review to commemorate the achievements of this organization during the past year, which now passes into history.

Every loyal adult leader and member can well be proud of our record and program. What has been acomplished has not been due alone to the work of National Headquarters, but to the cooperation of the men on the firing line in their effort to fulfill our object to constructively teach every boy and girl in America how to safely and accurately handle the rifle, and to make "America once again a nation of riflemen," thus making better citizens.

The various organizations, schools, Y. M. C. A.'s, churches, scout troops, camps, etc., have all become more interested and have cooperated more closely in our work. The volume of requests for information and assistance and the results accomplished have been pouring into National Headquarters during the year and are an indication that the sport of rifle shooting for Juniors is no longer an experiment but a reality.

It is interesting reading to know that more than twelve thousand members have affiliated and have received instructions through the Junior Rifle Corps. More than twelve thousand medals and diplomas have been awarded as a result of this instruction. Exactly ninety-one members qualified as Experts by placing five hundred shots in the bullseye in all positions. Fifteen members qualified as Distinguished Riflemen, receiving a gold bar to be attached to the Expert medal, the highest award offered for individual proficiency. Three hundred clubs affiliated, consisting of at least ten members, with an adult leader in charge. Many of them took part in the six hundred Winner Seal Matches conducted during the first five months of the year. This plan of matches has since been eliminated and a series of Inter-Unit Monthly Matches substituted, conducted on a handicap plan, putting every Unit on an even basis for each monthly championship and trophy.

But one Unit, No. 812 of the Fresno High School, Fresno, California, qualified as an Expert Unit, winning forty Inter-Unit matches. Unit No. 644, of the Grover Cleveland High School, St. Louis, Mo., was a close second, with thirty-nine matches won. Unit No. 2,742, also at the Grover Cleveland High School, was third, with thirty-seven matches, and Unit No. 1,884 at the Crosby High School, Waterbury, Connecticut, with thirty-one wins, fourth. The three Units mentioned are classified as Sharpshooter Units, having won thirty matches or better, and twenty-six as Pro-Marksman Units, having won more than ten matches. For each of the above gradings members of each team responsible for the club's standing were issued credit certificates having a cash value of one dollar, redeemable in merchandise through the N.R.A. Service Company.

This review would not be complete without mentioning the exceptionally fine season with the boy and girl camps. Rifle shooting is right at home in this outdoor project and played a prominent part in the program of more than two hundred summer camps. Camp Wood, State Y.M.C.A. Camp of Elmdale, Kansas, led the field in the number of individual qualifications, awarding 745 medals. Camp Greenbrier of Alderson, West Virginia, was a runner-up, with 398, and Teela-Wooket, a girls' camp at Roxbury, Vermont, third, with 161.

Never in the history of the camp matches conducted in two divisions for boy and girl camps has interest been so keen and the matches more hotly contested. In the boys' division no less than nine teams submitted "possible" scores, and the winner was determined by the number of shots in the 3⅛-inch "A" ring. Camp Mashnee at Monument Beach, Massachusetts, a newcomer coached by none other than Sam Moore of Newtonville, Mass., who holds any number of Junior records, turned in a five-man team score of 75 A's. Camp Greenbrier of Alderson, West Virginia, coached by Walter Stokes, made the match interesting by submitting 74 A's, coming in second, with Camp Sokokis, Bridgton, Maine, third and Camp Mowglis, East Hebron, N. H., fourth.

The girls were not to be outdone, and three teams submitted "possibles," and again the championship was determined by the number of "A" shots. Camp Alleghany's first team coached by Mrs. Walter Stokes turned in 73 A's, while Camp Matoaka at St. Leonard, Md., coached by Miss Adelaide Cotter, ran second with 63 A's. Camp Alleghany's second team came in third with 55 A's.

What does the coming year hold in store for us, and will our report for next year be as favorable as this one? It most certainly should be, and you in the field alone can give the answer. The enlarged program of individual qualifications and matches, the services of the N.R.A., the special purchasing privileges to affiliated members by the N.R.A. Service Company, the special issue of equipment through the Director of Civilian Marksmanship to affiliated High School Clubs and the cooperation of National Headquarters are at the disposal of every individual and organization in the country. When we stop to consider and look over the field we have before us we realize that the surface hasn't even been scratched. There are thousands upon thousands of schools, camps, scout troops, Y.M.C.A.'s churches, and kindred organizations that are unfamiliar with this program, and are yet to be approached. The necessary funds are not available for sending a representative into the field, and we are consequently charging each and every one of you as a field representative of this great organization. You can show your loyalty by organizing a club in your immediate community or by sending on to National Headquarters the names of leading citizens and sponsors of clean, wholesome, constructive sports so that we may write them.

In closing, let us encourage you to go on, emphasizing that this grand old sport of rifle shooting will make you happier boys and girls as well as finer and more useful men and women. The more you practice the more accurate you will become; the more you concentrate on the bullseye, the better you will be able to concentrate on your studies; the more you control yourself on the firing line, the better you will control your rifle and everything else it becomes your pleasure to use.

National Headquarters is with you to the finish and stands ready to cooperate with each and every individual and club in making "Rifle Shooting History" in 1927.

* * *

CLUB MATCHES ESPECIALLY CONDUCTED FOR YOUR INSTITUTION

THE Instructor or Club Secretary of every Junior Club affiliated was recently mailed an N.R.A. Gallery Program, listing several matches with their respective conditions for distinctive institutions. Has your club entry been submitted for the Freshman Team Match, the Intercollegiate Team Championship Match, Interscholastic Team Championship Match, Girls' Interscholastic Team Championship Match, or the Military School Team Championship Match? If not, now is the

time to give some thought to your team entry, for you will want to act early if your team is to be represented in these great national events.

* * *

FRESHMAN TEAM MATCH

Entries close January 8 for the Freshman Team Match. This match is open to not more than ten freshmen from any college or university affiliated with the N.R.A. Three stages constitute the match, the first stage prone, second stage 1 string prone, 1 kneeling, third stage 1 string prone, 1 standing. Each stage consists of two strings of two sighters and ten shots for record per man, the five high scores in each stage to count for record. The targets must be received in Washington not later than February 15.

* * *

INTERCOLLEGIATE TEAM CHAMPIONSHIP MATCH

This match may consist of one or more teams of not more than ten members from any college affiliated with the N.R.A., five high scores in each stage to count for record. Competitors may shoot on but one team. The course of fire consists of three stages fired at hours best suiting the convenience of the club, but an entire stage must be completed in one day. A stage will consist of two strings, each of two sighting shots and ten shots for record fired in the following order: First stage, two strings prone; second stage, one string prone, one kneeling; third stage, one string prone, one standing. Entries for this match close January 31, 1927

* * *

INTERSCHOLASTIC TEAM CHAMPIONSHIP

This match is open to one or more teams of not more than ten from any public or private, high, or preparatory school other than military schools affiliated with the N..R.A.. The match consists of three stages, the first stage prone; second stage, one string prone, one kneeling; third stage, one string prone, one standing. Five high scores each stage to count for record. Competitors will shoot on but one team. Entries close on January 31, 1927.

* * *

GIRLS' INTERSCHOLASTIC TEAM CHAMPIONSHIP

One or more teams of not more than ten from any public or private, high, or preparatory school affiliated with the association may enter this competition. Five high scores at each stage to count for record. This match consists of three stages, each stage consisting of two sighting shots and ten shots for record, prone. Entries close on January 23, 1927.

* * *

MILITARY SCHOOL TEAM CHAMPIONSHIP

Open to one or more teams of not more than ten from any military school affiliated. Five high scores each stage count for record, and competitors will shoot on but one team. The match consists of four stages, an entire stage to be completed in one day. A stage will consist of two strings of two sighting shots and ten shots for record, fired in the following order: First stage, two srings prone; second stage, one string prone, one sitting; third stage, one string prone, one kneeling; fourth stage, one string prone, one standing. Entries close January 23, 1927.

* * *

ADDED TO OUR SELECT LIST OF EXPERTS

THERE has been a decided trend toward greater activity on the part of our individual members during the past month. No less than six have qualified as Experts.

With the adoption of the new standard fifty foot target as the official Junior Rifle Corps target, the conditions for each of the qualifications have been changed. Our many Experts competing for Distinguished Riflemen should write National Headquarters for the new conditions before competing further.

* * *

Inter-Unit Match Trophy, Instructor Van Trump's Club carried off this one

OAK PARK UNIT WINS SECOND MONTHLY MATCH

UNIT 389 of Oak Park, Illinois, has been awarded the November Inter-Unit Trophy. The total score of the five high men on the team was 824, one point under the possible set. It is interesting to note, however, that the original score of this Unit was 826, but in accordance with the conditions of the match, two points were deducted from this total, due to the fact that the total score was one point higher than the possible set.

The November Match was the first of these events in which the new Junior Rifle Corps target was used. The new target is similar to the official N.R.A. target for 50 ft. shooting, in that the target is ringed along the same lines. The bullseye (black) of the target measures 1 3/16 inches, and the 7, 8, 9, and 10 rings are in the black. The entire diameter of the bullseye is equally proportioned so as to include the rings of higher value, and shots are given the value of the ring punctured. In the case of a shot puncturing two rings, it is given the count of the higher ring. Thus, if a bullet punctured the 9 ring, but touched the circle of the 10, the shot is scored as a "ten." Rings number 4, 5, and 6 are not in the black, but shots hitting in these are worth the respective value of the rings. Any shots outside of the four ring are scored as "misses."

There were eighteen teams entered in the second match. Only ten, however, as the reprint of the bullet in below shows, completed the match and made returns in time to tabulate the scores. Four of the teams, it will be noted, had not previously set their possibles, and consequently are listed at the bottom of the standing, arranged according to the value of scores made. It is urged that coaches or instructors of the groups make a special effort to cooperate in promptly notifying headquarters of these possibles, as this has an important bearing on the teams' standing. It is further hoped that the percentage of clubs not reporting will be reduced in the case of future matches. Match targets are now being mailed on the first of each month, and every team will have practically an entire month to complete its record firing. Let's make the January Match—the first in the new year—a record breaker. Scores of the November Event follow:

	Score	*Possible Set*
1. Unit No. 389, Oak Park, Ill.	824	825
2. Leavenworth High School, Waterbury, Conn.	866	875
3. Crosby High School, Waterbury, Conn.	907	920
4. Evanston Township High School, Evanston, Ill.	936	955
5. Unit No. 2,654, Newtonville, Mass.	930	984
6. Wilby High School, Waterbury, Conn.	783	850
7. Grover Cleveland High School, St. Louis, Mo., No. 1	909	
8. Grover Cleveland High School, St. Louis, Mo., No. 2	902	
9. Lewis Clark High School, Spokane, Wash.	879	
10. Unit No. 2,843, Wilmington, Del.	619	

(NOT REPORTED)

Irving Park Rifle Club, Chicago, Ill.
Hyde Park Y.M.C.A., Chicago, Ill. (2 teams).
Unit 2,750, Hartford, Conn.
Unit 562, Fall River, Mass.
Unit 2,634, Arlington, N. J.
Unit 892, Boston, Mass.
Fresno High School, Fresno, Calif.

* * *

LET US GET TOGETHER IN THIS MEMBERSHIP DRIVE

THE fact remains that you wouldn't be a member of the Junior Rifle Corps if you weren't interested in rifle shooting as a sport. Before we can play the game we must first learn the fundamentals of the rifle and its use. The instruction has been supplied all members affiliated, with a complete course of individual qualifications and matches as incentives for accuracy. Consistent practice with the desire to become an expert shot soon fulfills our aims.

But, practice alone won't bring on accuracy unless some thought is given our equipment, which must at all times be in perfect condition.

As we at National Headquarters are interested in the development and achievements of each individual affiliated we are inaugurating a plan of helpful co-operation, mutually beneficial, that will make your advancement so much more rapid. Some of you have heard

of Lt.-Col. Townsend Whelen who is a recognized national authority on rifles, ammunition and equipment and have possibly read some of his articles. He has prepared a book, "Amateur Gunsmithing," which explains in the language of the amateur how to construct a rifle and its many parts, with helpful suggestions for making your particular rifle better suited for your own individual use. This book retails for $2.00 and is sold to members of the Association for $1.50.

We also have another book prepared by Col. A. J. Macnab, Jr,. U. S. A. Rifle and Pistol Instructor of all the American forces in France during the World War, "Pistol and Revolver Training Course." This book is also reduced to 50 cents to affiliated members.

These books a $2.75 value are yours not for "coin of the realm," but a little effort and co-operation with National Headquarters on your part. The plan is simply that you enroll ten individual members in the Junior Rifle Corps at 25c each and the books are yours for 50c. There are thousands of boys and girls in this great country of ours who are interested and really want to learn how to handle a rifle, but have never been approached, or don't exactly know who to write to. You know better than we do who these boys and girls are—for you are associating with them every day at school, at church, your gymnasium clubs, Scout troop or club. They are your prospects and need only your encouragement to become members of this rifle shooting fraternity.

Perhaps you are a Unit or Club member. In that case you can enroll your entire club as individual members. Ten applications with your own included at 25 cents each and 50 cents will bring these books to you. As an added incentive we are going to give to the first ten members bringing in ten individual members an original pen and ink drawing of the cover page of THE AMERICAN RIFLEMAN, the official publication of the National Rifle Association.

This organization is your organization, and it will only be what we hope to make it if we all put our shoulders to the wheel and put this co-operative membership drive over. Increased membership brings on increased activity, and increased activity means that we are making headway toward teaching every boy and girl in America how to safely and accurately handle the rifle. You can get the jump on the other fellow if you will write National Headquarters today for a supply of application blanks. The books and the drawing as a special are yours for the effort.

* * *

STOCK EXCHANGE BOOSTS SCHOLASTIC SHOOTING IN NEW YORK

THE New York Stock Exchange Rifle Club decided this year to get behind interscholastic rifle shooting in New York. To that end the committee of arrangements of the Stock Exchange offered a large trophy in the form of a plaque, together with attractive, distinctive medals to be contested for in a tournament held among the various high schools in New York City and the boys of the Stock Exchange.

Mr. Frank Delbon, Chairman of the Athletic Committee of the Crescent Athletic Club in Brooklyn, as usual, rendered his heartiest cooperation and the Crescent Athletic Club were the hosts to the boys on Saturday, November 7th. Thirteen teams took part in the match, firing under the rules of the Public Schools Athletic League.

The conditions called for teams of six, ten shots standing and ten shots prone at 50 feet. Evander Childs School, after getting away in second place at the standing position, came from behind in the prone position and nosed out Alexander Hamilton School, 1,007 to 983. The scores were as follows:

Evander Childs	1,007	Erasmus Hall	835
Alexander Hamilton	983	Jamaica	814
Thomas Jefferson	933	Manual Training	804
Morris	928	Boys' High	753
Stock Exchange	920	George Washington	722
Stuyvesant	898	New Utrecht	531
DeWitt C'inton	868	Curtis	476

Individual high gun honors went to Captain Lester Dailey, of the Alexander Hamilton squad. He turned in a score of 96 standing and 98 prone. Dailey received a gold medal as a result of this fine individual performance, while the winning team from Evander Childs received sterling silver medals and a bronze plaque. The Alexander Hamilton Team received bronze medals as runners-up.

* * *

KEMPER OPENS SEASON WITH WIN FROM BORDENTOWN

THE Kemper Military School Rifle team of Boonville, Mo. opened the season with a win in their first indoor rifle match with the Bordentown Military Institute of Bordentown, N. J. The conditions of the match called for ten-man teams with five high scores to count, two sighting shots and five shots for record in each position; standing, kneeling, sitting and prone. Registered targets, the official N.R.A. fifty foot were exchanged by each school prior to the match and all scores were telegraphed not later than 6.00 p. m. on the date of match. The following are the individual scores made in the match:

KEMPER MILITARY SCHOOL

	Standing	Kneeling	Sitting	Prone	Total
Lappe, J. B.	46	50	49	50	195
Schmidt, M. G.	46	48	49	50	193
Johnson, C. A.	48	48	48	49	193
Riggs, J. W.	45	46	47	47	185
Chick, C. M.	44	45	44	50	183
Walbert, C. R.	46	46	44	46	182
Arno'd, G. A.	43	38	49	48	178
Campbell, J. E.	37	49	39	49	174
Cole, H. S.	38	42	42	48	170
Powell, L. H.	36	28	38	50	152
Total five high scores					949

BORDENTOWN MILITARY INSTITUTE

	Standing	Kneeling	Sitting	Prone	Total
Butler, R	14	37	48	44	143
Gleason, L. C.	28	38	49	50	165
Cooper, F. M.	34	35	40	45	154
Boles, H.	31	42	46	50	169
Holmes, W. C.	40	42	41	44	167
Stone, R. N.	15	22	32	44	113
Gleason, J. J.	30	26	46	46	148
Doyle, F. J.	35	41	43	46	165
Total five high scores					820

Two men disqualified.

* * *

EXPERTS

Robert Gray, Philadelphia, Pennsylvania.

W. E. Dunkinson, Jr., Kearney, New Jersey.

William Toms, Chicago, Illinois.

Edwin Loeber, Richmond, Virginia.

Joseph Howland, Plain City, Ohio.

Russell Dressler, South Bend, Indiana.

Honor Members Qualified as Distinguished Riflemen

THE following have qualified for the highest honor offered by the Junior Rifle Corps for individual proficiency with the rifle during the past year:

Antone Poczik, Detroit, Michigan.
Silas Mennie, Detroit, Michigan.
Albert Diamont, Fresno, California.
Grant Dell, Chicago, Illinois.
Fred Schneider, St. Louis, Missouri.
Philip Fleisher, New York, N. Y.
Emil Blazak, Cleveland, Ohio.
E. Lowell Mason, Charlotte, N. C.
Dean Earl, Nickerson, Kansas.
Alfred Mulliken, Springfield, Mass.
Alven Dell, Chicago, Ill.
Richard Patey, Newtonville, Mass.
Stanley Patla, Chicago, Illinois.
Alan Leslie, New York, N. Y.

National Guard Backs N. R. A.

(*Continued from page* 11)

properly put on Congress, we shall get the money necessary, and with an equalizing of conditions regarding entrants we shall have one of the greatest matches in history at Camp Perry in 1927."

General Beary's action followed discussion on the floor, at which it was pointed out that the National Guard units are handicapped in competition with the various arms of the regular services. The Army, Navy, and Marine Corps, it was declared, have much more time for practice than has the National Guard, and in addition, more liberal allowance for shooting material. This it is the purpose of the committee to seek to remedy.

Among the speakers at the convention were the Assistant Secretary of War, Hanford MacNider, Gov. William J. Fields of Kentucky, Brig.-Gen. Ellerbe Carter, of the 63d Field Artillery of Louisville, Maj.-Gen. Creed C. Hammond, chief of the militia bureau, and Maj.-Gen. Robert C. Davis, the Adjutant General of the Army.

The new officers elected were:

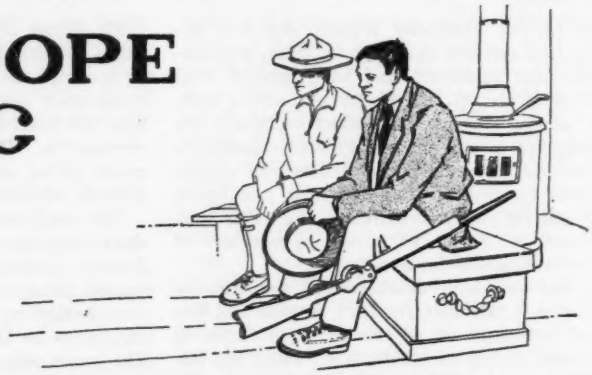
Maj.-Gen. William G. Price, Jr., of Pennsylvania, president; Gen. G. A. Fraser, North Dakota, vice-president; Col. E. A. Walsh, Minnesota, secretary; Brig.-Gen. Milton R. McLean, of Kansas, treasurer.

Additional members of the executive committee from the respective corps areas are:

First Corps Area—Lieut.-Col. M. A. Campbell, Vermont. Second Corps Area—Brig.-Gen. J. A. Ellison, Delaware. Third Corps Area—Brig.-Gen. W. Gardner Waller, Virginia. Fourth Corps Area—Brig.-Gen. L. A. Toombs, Louisiana. Fifth Corps Area—Brig.-Gen. Frank A. Henderson, Ohio. Sixth Corps Area—Brig.-Gen. John A. Garrity, Illinois. Seventh Corps Area—Col. H. J. Paul, Nebraska. Eighth Corps Area—Gen. Charles W. Harris, Arizona. Ninth Corps Area—Brig.-Gen. George A. White, Oregon.

Maj.-Gen. Milton J. Foreman of Illinois, veteran of thirty-five years of service, was made honorary president for life.

THE DOPE BAG



A Free Service to Target, Big Game and Field Shots—All questions answered directly by mail

Rifles and Big Game Hunting: Lt.-Col. Townsend Whelen **Pistols and Revolvers: Major J. S. Hatcher**

Shotgun and Field Shooting: Captain Charles Askins

Every Care is used in collecting data for questions submitted, but no responsibility is assumed for any accidents which may occur.

Those Friendly Rifles

By Townsend Whelen

HAVE in mind a rifle for "chucks," cottontails, squirrels, and occasional shots at geese and hawks. Mr. Wagar's article, "Friendly Little Rifles," has about decided me on the .28-30-120 Stevens. Can I expect 2½-inch groups from carefully loaded ammunition in good, tight action and Niedner barrel at 100 yards? Don't know anything about these heavy single-shot actions except from pictures and articles in the RIFLEMAN. I have the impression that one of those actions will handle different cartridges without any change. Is this correct? Would a Winchester .32-40 S. S. or Ballard action take the .28-30 without any shange, on would I have to get a Stevens action?

I understand the Remington people are producing a "free" .22-cal. rifle, using the Remington-Hepburn action. Could a .28-30 barrel be fitted to this action? Would like to learn more about these single-shot rifles and target shooting with them. Can you give me the name of any book on the subject?—E. M. H.

Answer (by Col. Whelen). A rifle shooting the .28-30-120 Stevens cartridge certainly appears to be a very attractive "Friendly Rifle." But before we jump in with both feet let us look over the matter a little.

First, cartridge cases for the .28-30 Stevens are no longer made. A recent inquiry sent to all the companies who had previously made these cartridges resulted in the information that they had no more in stock. First, therefore, you should write to the Niedner Rifle Corporation to see if they can supply you with sufficient cases to last you for about five years. I say five years because none of these cases have been made since the war, and our experience has been that after a case is ten years old it is very liable to crack from age. Therefore, even if you do get cases, you can figure that the rifle will only last you about five years, after which there will be no more cases available anywhere.

I understand that Winchester can still furnish parts of their single-shot action, so that Niedner could make up a complete rifle for you with that action. I know of no better breech action for a single-shot rifle. It is splendid. The Remington-Hepburn action is also very good, but Remington is no longer making that action. It would probably be very difficult to obtain one, and it is not quite as convenient an action as the Winchester.

Now, as to what accuracy you will get from the .28-30-120: Niedner makes an excellent barrel in that caliber, but an excellent barrel has to have good ammunition or it will not shoot at all. The .28-30 is essentially a black powder rifle. Black powder has never performed as well as modern smokeless loads do. About 3-inch groups is all that can be expected from any cartridge where the bullet is seated in the case, and often they are not much better than 4 inches at 100 yards. I would be a little afraid of the use of smokeless powder in the .28-30 barrel. That is, I would be afraid that under the conditions under which all modern smokeless powders would be compelled to burn in this cartridge, and the way that all existing primers act when used with powder burning this way, that the fouling would be excessively corrosive and erosive, and that, despite the most perfect method of cleaning, a few hundred rounds would ruin the bore if smokeless powder were used. I am not absolutly positive of this, but past experiences surely point to danger in this respect.

It is my opinion, therefore, that a man who already has a .28-30 rifle should continue to use it while he can still get cases, and while the cases he can get still remain serviceable. It is certainly a very ideal caliber for general use. But I do not believe, for the reasons stated above, that it is the caliber for one to get new at the present time.

I, too, have done considerable thinking on the subject of "The Friendly Rifle." There should certainly be some friendly caliber between the .22 long rifle and the ultra high-power loads like the .30-06, which will be gilt edge in every way. At first glance it would seem that the .25-20 would be such a cartridge, but unfortunately it has serious faults. For one thing, the bullet has to be seated so deeply into the neck of the case that it precludes the finest accuracy. For best accuracy a bullet should be seated only deep enough in the case for security, and should have much of its bearing outside the case, and the barrel should be threaded ahead of the chamber to accept this long bearing, thus straightening the bullet up with respect to the axis of the bore, and insuring the bullet sliding from the case into the rifling with the least jump and least chance of deforming itself in doing so. If the .25-20 bullet were seated far out of the case to accomplish this, the cartridge would not work through the magazine.

Another difficulty with the .25-20 smokeless cartridge is that it is subject to the same corrosion and erosion which I mentioned above in the case of the .28-30, but in a much exaggerated form. Our experience has been that when smokeless cartridges are used in the .25-20 that they give very fair accuracy, but that it is practically impossible to keep the bore in condition for long, despite the most perfect care in cleaning. Recently one of the cartridge companies conducted a very interesting experiment with .25-20 rifles in connection with their experimental work on the development of a non-corrosive center-fire primer. A barrel was fired 750 rounds, using regular production smokeless ammunition, cleaning carefully after each few shots, and in spite of this the barrel was very badly eroded near the breech, and even for several inches along the barrel large fissures were seen in the metal as though from heat erosion. In comparison, another .25-20 barrel was fired 1,250 rounds with the experimental non-corrosive primer, and same powder, and at the end of the test this barrel appeared perfect in every respect. In this connection it may be stated that a satisfactory non-corrosive smokeless primer has not yet been developed. It looks as though we may have such a primer some day, and that it will solve many of our present problems, including the problem of the .25-20. But that day has not yet arrived, and it may be some years before it does. Until that time we have to worry along with our present primers. But even with the primer trouble solved, the .25-20 will never quite equal some other cartridges because of the depth to which the bullet has to be seated in the case.

I think that from the standpoint of the Friendly Rifle, the .25-35 Winchester cartridge offers the best results. It is an exceedingly accurate cartridge even in ordinary barrels. Niedner makes a superb barrel for it, which can be fitted to a Winchester single-shot action. The bullet can be loaded to project the ideal amount outside the case. It can be loaded with quite a powerful load up to about M. V. 2,450 f. s. with 100-grain jacketed bullet, and M. V. 2,250 f. s. with 117-grain jacketed bullet. It can be loaded with the 87-grain Savage jacketed bullet and 10 grains of du Pont No. 80 powder, giving a muzzle velocity of

1,520 f. s., and perfectly superb accuracy, thus duplicating the .25-20, but with very much finer accuracy, and very much longer barrel life. Or it can be loaded with lead alloy or gas-check bullets and light or medium loads of smokeless powder. We do not run into corrosive and erosive problems with this cartridge. The bore can be kept in perfect condition almost indefinitely by proper cleaning. In every way, therefore, the .25-35 W. C. F. cartridge seems to qualify perfectly as our Friendly Cartridge. It is accurate enough for the finest kind of competitive target shooting up to 300 yards at least. It can be loaded heavily enough for good effect on game up to deer. It is a very ideal woodchuck cartridge. It can be loaded light enough for perfect results on the smallest game.

The result is that I am inclined to recommend that you have Niedner place a .25-35 barrel of his make on a Winchester single-shot action, instead of a .28-30 barrel.

If I can do anything further for you in this connection, please let me know, but next time address your letter to me at THE AMERICAN RIFLEMAN, 1108 Woodward Building, Washington, D. C. You addressed your letter this time simply "Washington, D. C.," and it was only by luck that it reached me.

* * *

STOCKS, 7 MM.'S, AND SUCH

IN MY Improved Savage Bolt-action Rifle I have been using Western Tool & Copper 100-grain bullets and like them very much. I note from their folder that they make three bullets for the 7 mm., 170-grain, 150-grain, and 110-grain. I have in mind using the two latter ones, as I believe the 150-grain is as heavy as I will need around here, and here is where I expect to do my shooting for some time. I will appreciate any loads for these bullets that you may have available using 17½ du Pont I.M.R. powder.

Recoil is the one big factor with me in getting the rifle that I want, for while in the Service during the late War I developed tuberculosis, which has left me with one lung flat. Even that, however, doesn't keep me from doing a little shooting, but I do favor this right shoulder of mine with an anti-flinch pad on both rifle and shotgun. Will it be possible to get 3,000 feet per second velocity with the 110-grain bullet, above mentioned, with the tight chamber that you spoke of, and about 2,700 f. s. with the 150-grain bullet I will not attempt these loads for some time because of the recoil which might result.

While convalescing here in the Southwest, my play moments naturally turned to guns. I learned of the N.R.A. through "Bill" Sukalle, owner of the Tucson Cylinder Grinding Shop, who also likes guns. He liked the job that I did remodeling my Krag stock and since then has been turning over all the stock work that he gets on guns to cut down. This summer I made my first entire stock for a man who has in the past had his stocks made by Griffin & Howe and the Hoffman Arms Co. He told a local sporting goods dealer who doesn't or didn't know me at the time that it is the best job that he ever had done. With that remark from him I am going to build the stock for this rifle—in fact, that is what started me to thinking of having a rifle made up. The question now is, where can I get a good, nicely grained piece of Walnut for not a great amount of money. Tait doesn't seem to want to sell blanks, and Harner didn't have anything much in Circassian, but Hoffman will sell me one for from $10.00 to $100.00. I do not know where to come in on that range. I do, however, want a stock so that when the rifle is complete it will look as well as this No. 3-E 20-gauge Ithaca of mine, or outshine it a little. If you know anything about their blanks or the blanks of any other company having them for sale I will be glad for your opinion as to what to get.

The barrel I want 22 inches long, and what will be the best outside dimensions for it, since I am going to make the stock.

As yet I haven't decided about the sighting equipment. I would like a Belding and Mull Telescope (3-X Hunting) which I may get and not get any iron sights. In the case of iron sights the usual thing seems to be a long ramp front sight (which I don't know much about) and a Lyman .48 rear. But I am going to try out the Howe-Whelen sight, because I think that the safety device incorporated in the Howe-Whelen is about the best addition that I have seen on a Springfield Sporter. (I said seen, but mean heard of, as I have never seen one of these sights.) How do these sights compare from the standpoint of rigidness and for hunting?

From this letter you will learn what is in my mind in regard to the 7 mm. that I want, and any further information that you may give me besides what I have asked for will be highly appreciated.—C. H. H.

Answer (by Col. Whelen). I believe that the best plan for obtaining first-class 7 mm. rifle would be to obtain a Springfield breech action complete, and have the Neidner Rifle Corporation, Dowagiac, Mich., place one of their 7 mm. barrels on this breech action. This is the course that I have just adopted in obtaining a new 7 mm. rifle of my own, and the rifle is certainly everything that I had hoped it would be.

Presuming that you are a member of the N.R.A., you write to the Director of Civilian Marksmanship, War Department, Washington, D. C., telling him that you wish to purchase a .30 cal. Springfield breech action complete, National Match quality, with regular cocking piece and regular safety. Remit $16.89 plus 50 cents packing charge, total $17.49, by certified check, bank draft, or postal or express money order to his order. Ask that the breech action be sent to the Neidner Rifle Corporation by express for your account, tagged with your name. Then you take up the rest of the matter with the Neidner Rifle Corporation.

The Neidner Rifle Corporation make two types of 7 mm. barrels. One they chamber rather large, with chamber somewhat like the German and Spanish 7 mm. rifles, to be used with the Western Cartridge Co. ammunition, loaded with 139-grain open-point bullet, M. V. 3,000 f. s. in 30-inch barrel. This will take all makes of ammunition, and is the only American barel I know of that is entirely safe with this 3,000 f. s. load of the Western Cartridge Co., which gives very high pressure. I imagine that this barrel, shot with a good telescope sight will give groups at 100 yards running from 2¾ to 3½ inches. Then, Neidner also makes a special barrel, chambered rather tighter and more accurately for factory cartridges other than the 3,000 f. s. Western cartridge, and for hand-loaded ammunition. This barrel should give groups running from 1½ to 2½ inches at 100 yards, perhaps sometimes smaller, depending of course on the ammunition and the excellence of the bullet. This barrel would give rather excessive and perhaps dangerous pressures with the 3,000 f. s. load of the Western Cartridge Company.

If you are going to use a telescope sight on your rifle, and wish to get the best accuracy possible, and contemplate reloading, this latter barrel is strongly advised. This is the type of barrel which I have for myself.

I think that it would be well to have the barrel made with the same general outside diameter and shape, as that of the regular service .30 cal. Springfield barrel. This will insure a good, stiff, and accurate barrel. It matters little whether you use the regular Springfield rear sight fixed and movable front sight studs, a front sight stud quite similar to it which Neidner usually places on his barrels, or a fancy inclined ramp front sight base. They are all good, and it depends entirely on which the individual thinks looks best on the rifle.

As to length of barrel, you say you want a 22-inch barrel. I think that 22 inches is a little too short, because I do not think that you can get the desired velocity with such a short barrel. Particularly, I do not think that you can get enough velocity with a 22-inch barrel to properly mushroom the 170 and 150-grain Western Tool and Copper Works bullets, although you might get enough for the 110-grain bullet of that weight. I think that the barrel ought to be between 24 and 26 inches long. My own barrel I had made 25 inches long. The reason for a longer barrel will be made manifest when we come to discuss the ammunition.

Probably the maximum safe loads you will be able to use in a tight and accurately chambered Neidner barrel will be about as follows:

170-grain W. T. & C. bullet, or 175-grain Western Cartridge Company soft-point bullet. Powder charge, 39 to 40 grains of du Pont No. 17½ powder. Thirty-nine grains will give about 2,375 f. s. in a 30-inch barrel, or about 2,250 f. s. in a 25-inch barrel, or about 2,175 f. s. in a 22-inch barrel. In my opinion anything less than M. V. 2,300 f. s. is too little to properly expand the 170-grain W. T. & C. bullet, although probably 2,200 f. s. will expand the 175-grain Western soft-point bullet all right. I am not sure that even 2,300 f. s. will properly expand the 170-grain W. T. & C. bullet to make it kill well on large game. I think that the very best large game bullet is the 175-grain Western soft-point bullet. In the Springfield action, and Neidner, it is usually possible to seat the bullets considerably further out of the case than the factory cartridge, thus giving better accuracy and lower breech pressure. Start in with a 39-grain charge of powder. If this works all right, increase to 40 grains. 150-grain W. T. & C. bullet. Maximum charge of powder will be about 43.5 grains No. 17½. So far as I know, no chronograph test has been made with this bullet, so we do not know exactly the velocity. I would estimate that 43.5 grains of the above powder will give between 2,450 and 2,550 f. s. with the 150-grain bullet in a 22-inch barrel. This is not sufficient velocity to properly expand this bullet on game. I had an idea that this would be a most excellent game bullet. It is very accurate. Accordingly, I loaded up a number of rounds for a friend of mine to use on large game in Alberta this fall. He used a Griffin & Howe rifle with Neidner barrel, 22 inches long. This ammunition failed on big game in Alberta last fall. Bullets penetrated too cleanly, did not mushroom, and apparently had no stopping power. I hardly think that even a 26-inch barrel would give this bullet sufficient velocity to properly mushroom it, and I do not think that it ought to be used for other than target practice.

110-grain W. T. & C. bullet. I think that a charge of 46 grains of No. 17½ powder could be used, and that this 46-grain charge should give about M. V. 3,000 f. s. in a 25-inch barrel, or about 2,800 f. s. in a 22-inch barrel. It should be a fine load for coyotes

and other varmints, expanding and killing well on all small animals. Better start in with 45 grains of powder and work up gradually to 46 grains, watching for any excessive pressure. I do not know of anyone who has tried this bullet, but I should think that this bullet would make up into a very excellent varmint cartridge.

139-grain Western Cartridge Co. bullet. Open point or full jacketed, pointed. Reduced load. 17 grains weight du Pont No. 80 powder. M. V. 1,500 f. s. An extremely accurate light load. The full jacketed, pointed bullet will shoot through the breasts of grouse and probably quail without destroying any meat to speak of, but does not have quite enough killing power for larger game. For larger small game, use the open-point bullet. The open point will not expand at this velocity, but the blunter open point makes the bullet kill better on the larger of the small game. This is a most valuable small-game load, and it is also fine for general target practice.

My advice would be to use the 175-grain Western soft-point bullet with 39 to 40 grains fo No. 17½ powder, or the Western factory 175-grain soft-point cartridge for all large game. Use the 110-grain W. T. & C. bullet for coyotes and larger varmints, and use the 139-grain Western bullet for small game generally. The recoil with all these cartridges in an 8-pound rifle will be very decidedly less than that of the .30-06 cartridge. Do not think that the recoil will bother you a bit.

By all means make your own stock for this rifle. I am very glad to learn that you have had such fine success in stock making. As a matter of fact, an amateur who has a liking and a gift for this kind of work can do much better than the professionals like Griffin & Howe and Hoffman, because he probably has as much skill as their workmen, but they have to finish up a stock in about two days labor to make a profit on it, whereas the amateur can take all the time he wants to perfect his stock far above what the professional can afford to.

Now, with regard to the sights. That is still another problem. The Belding and Mull 3-power hunting scope Model 3A, with the T-H mount, and "D" type rear adjusting screws, reading to half minutes of angle, is a perfectly superb sighting device, extremely accurate and extremely practical, good for quick shots, or shots in very poor lights, far better than any metallic sights. The sight is also big and clumsy, but we can forgive that, due to its other fine points.

The B. & M. scope should be mounted on the rifle by means of a rib or strip of steel which passes directly over the top of the receiver, and is secured to the breech of the barrel and the bridge of the receiver by dovetail blocks. The scope mounts are placed at the proper place on this rib. The rib interferes with clip loading, of course, but does not otherwise interfere with the operation of the rifle. Only thus can the scope be so mounted that the eye-piece will be the right distance from the eye and still have a really strong and sturdy mounting. This mount is quite similar to that on the Remington Model .30 rifle. B. & M. have just published a little booklet on their sight and the Remington Model .30 rifle, containing articles by Captain Askins and myself, which they will send you on request. This contains cuts of the sight and of the Remington rifle with the sight mounted on it with one of these mounts so that you can visualize what it will be. On the Springfield action the scope must be mounted higher up above the barel and action than on the Remington, in order that the bolt handle will clear the scope when the action is opened and operated. This means a larger drop at comb from the line of aim of the scope. It cannot be helped, and in actual practice it does not make so much difference because one gets accustomed to resting his chin on the comb instead of the side of his cheek. The B. & M. pamphlet will tell you a lot more about the sight. Better ask them also to send you one of their regular telescope sight catalogues, then you will have the whole thing.

Now, as regards the metallic rear sight. You, of course, know all about the Lyman No. 48 rear sight. I rather think that it would be better to have a Howe-Whelen rear sight on this rifle if you are going to have a scope. The Howe-Whelen is a pretty good sight, and with a telescope it has the added advantage of the safety lock on the side. With the regular Springfield safety lock on top of the sleeve, it is difficult to turn the safety over on account of the tube of the scope being so close down on top of the rifle—hard to get the fingers in under the tube to get a grasp on the safety.

If, however, you are not going to use a scope on the rifle, then I think that perhaps the Belding and Mull sleeve sight is the best rear metallic sight. It is a remarkably good, accurate, and convenient sight, and a very quick one. Both the H-W and the B. & M. sights have the slight disadvantage that they do not turn down for putting in a case or in a saddle scabbard, but that is not much of a drawback. Both also require just a little more effort than usual to close the bolt, as it is during the last quarter of inch of closing the bolt that the stop-pins or springs are forced up on top of the tang of the receiver, thus forcing the sight to a uniform position with reference to the receiver for each shot.

With regard to the walnut blank from which to make your stock, I think that the Hoffman Arms Company is about the only place that you can be sure of getting a good, well-figured piece of imported or Circassian walnut. Such wood is deucedly hard to get these days, and the other companies have so much trouble in getting blanks for the stocks they have to make themselves that they do not like to sell it. They have to pay anywhere from $15.00 to $50.00 each for these blanks in large lots, and then, in addition, pay the duty on them after they arrive, and the freight besides. Then, too, they cannot get any wood from abroad by simply ordering it by mail. They all combine together and send a representative abroad once a year to buy their year's supply of walnut, so you see that really good imported walnut is a pretty hard thing to get, and a hard thing to get them to part with. It happens, I think, that Hoffman is overstocked on walnut, and that is the only reason why you can get blanks from him.

Firearms Trade Notes

JOHN B. SMILEY ELECTED PRESIDENT REMINGTON ARMS COMPANY

JOHN B. SMILEY has been elected President of the Remington Arms Co., Inc., and its subsidiaries, to succeed Charles L. Reierson, who recently resigned.

JOHN B. SMILEY

Mr. Smiley comes to his new position with a background of experience and abliity. His business life has been both active and varied. As a college graduate, he joined the operating department of the Pennsylvania Steel Company, and learned the practical side of steel production. He was then associated with the sales department of the company for several years, after which he engaged in business for himself as a consulting engineer and contractor in Western Canada. Later, he conducted an export business in New York, except for a period from 1917 to 1919, when he was President of the Bayless Shipyard, engaged in building fabricated steel vessels for the Emergency Fleet Corporation.

During the past year he has been acting in a special executive capacity for the Remington Company.

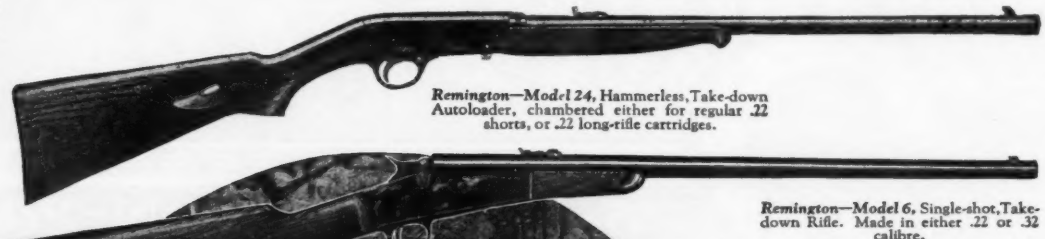
J. G. Heath has been made vice-president of the company, in charge of firearms, ammunition, cutlery, and cash register sales. He will be assisted by Harry J. Strungnell and George Rugge. Both Mr. Strugnell and Mr. Rugge have been with the Remington Arms Company, Inc., for a number of years.

* * *

NEW LONG-RANGE SHOTSHELL ANNOUNCED BY WINCHESTER

WINCHESTER Repeating Arms Co. has announced a new repeater speed loads. Using the Winchester Repeater shell case, with red-colored wrapping to distinguish the new shell, and the modern progressive burning powders, the company's shell experts have produced a series of high-speed shells that can be depended upon to reach, to cover, to kill the largest and speediest of shot-shell game at the utmost ranges at which a sportsman can expect to bring down his game.

The speed and range made possible by the development of this new type of powder have been skillfully utilized with the results of Winchester ballistic experience and shell manufacturing knowledge to produce a series of 64 top loads. Each load offers a heavy powder and shot charge, and many of the loads represent the maximum powder loading in their gauge that is possible with assured safety and good shooting results. Speed loads are maximum loads designed for shooters who want the heaviest obtainable loads combined with the Winchester balanced loading that has made Winchester shells famous. Every load is loaded to scientifically determined ballistic standards, proved by thorough shooting tests.



Remington—*Model 24*, Hammerless, Take-down Autoloader, chambered either for regular .22 shorts, or .22 long-rifle cartridges.

Remington—*Model 6*, Single-shot, Take-down Rifle. Made in either .22 or .32 calibre.

Remington Kleanbore Cartridges

Remington Kleanbore Cartridges Prevent Rust, Corrosion, and Pitting

HERE'S good news for rifle shooters. You know what a job it is to clean the rifle after a hard day hiking through the woods. You'd rather loaf around the camp fire. But unless you get out the old cleaning rod and go to work, you'll have rust in the barrel before morning; and rust destroys accuracy. Now for the good news:

Remington Kleanbore Cartridges make cleaning unnecessary. This marvelous new ammunition absolutely prevents rust, corrosion, and pitting. Remington Kleanbore Cartridges are different from ordinary ammunition because the priming mixture does not contain salts that attract moisture and cause rust. It contains ingredients that seal the pores in the steel and make the bore of rifle barrels rustless and stainless. Kleanbore Cartridges, by keeping the bore in perfect condition, will improve the velocity, increase the accuracy, and prolong the life of your rifle.

If you have been shooting ordinary ammunition, clean the bore of your rifle thoroughly with boiling water to remove all traces of the injurious salts. Then shoot Remington Kleanbore Cartridges exclusively and you will not have to clean the inside of the barrel.

Caution: For your own protection, be careful to avoid substitutes. You can identify this new ammunition by the name, Remington Kleanbore, on the green box. They are the only cartridges that will do what we claim for them.

And think,—Remington Kleanbore Ammunition costs the same as ordinary cartridges. Get them from your dealer in .22 shorts, longs, and long-rifle.

REMINGTON ARMS COMPANY, INC.
25 Broadway *Established 1816* New York City

Remington

RIFLES AMMUNITION SHOTGUNS GAME LOADS CUTLERY CASH REGISTERS

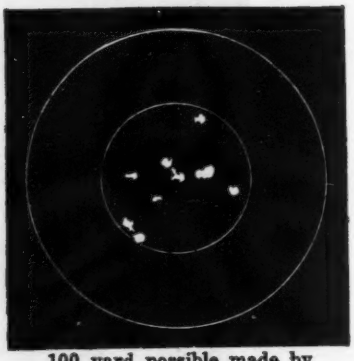
Eight Dewar Match Possibles With *WINCHESTER* Precision

TRADE MARK

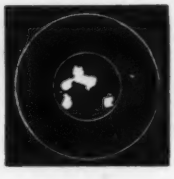
WHEN the British team won the Dewar cup last September eight possibles were shot by its members in compiling their record score of 7793x8000. Seven of these were shot at 50 yards and the eighth was made over the 100 yard range.

The accompanying reproductions of the actual targets shot in making these possibles show the remarkable accuracy and the splendid grouping secured. Every one of these possibles was made with Winchester PRECISION .22 Long Rifle rim fire cartridges—the ammunition of Victory.

Dependable ***Uniform*** ***Accurate***



100 yard possible made by A. JARMAN who also made a possible at 50 yards



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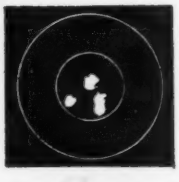
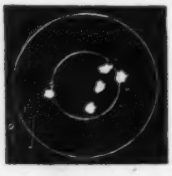
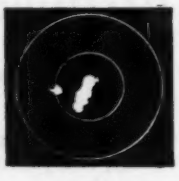
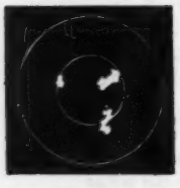




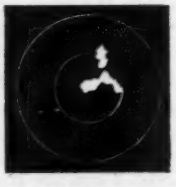
50 yard possible made by L. D. BROOKS

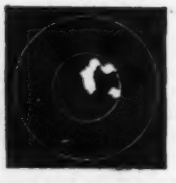


50 yard possible made by S. F. CHORLEY

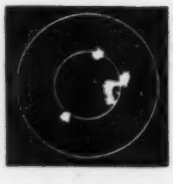


50 yard possible made by H. D. BUCK

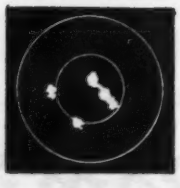




50 yard possible made by G. F. BOOTH



50 yard possible made by S. F. CHORLEY



50 yard possible made by A. JARMAN

MANUFACTURED BY

WINCHESTER REPEATING ARMS COMPANY

NEW HAVEN, CONN., U. S. A.

The Arms Chest

READ TERMS BEFORE SENDING ORDER

THE uniformly excellent returns from advertisements appearing in the classified columns of THE AMERICAN RIFLEMAN make it a most satisfactory and productive medium for the disposal of surplus shooting equipment, or the acquisition of special types of firearms.

Free Insertions. Each subscriber is entitled to one insertion of ten words when his subscription is paid for one year. It is necessary only to write or print the text plainly on one side of the paper only, noting thereon the date subscription was paid. These advertisements will appear in the first available issue and should be in publication office three weeks prior to the following publication date. All words in excess of 10 must be paid for at the rate of 10 cents a word. Cash MUST accompany order.

Paid Insertions. Non-subscribers or those who have already made use of the subscriber's privilege may take advantage of these columns at a cost of 10 cents a word. No advertisement for less than $1.00 accepted. They should be in the publication office three weeks prior to the time appearance is desired.

WANTED—American Firearms. Hunt up your discarded firearms. Have your friends do likewise. In every family there are fireams discarded as being obsolete. Send a list of what you or your friends have. If the pieces are what I want, I will offer top prices. S. Harold Croft, Balacynwyd, P. O. Pa. 12-1-27

CLOSING out entire stock of genuine Mauser and Mannlicher rifles, Sauer shotguns. Lowest price in U. S. Send stamp for list. Baker & Kimball, 38 M South St., Boston, Mass. 1-1-27

FOR SALE—7 mm. Mauser; .32 Hammerless; 12 ga. single; Savage .22 Sporter; Winchester .22 1890; .45 Frontier; Luger .32-shot magazine; War medals; Powder scales; 7.62 and .38 Special empties; belt, holster .45 auto.; .45 and .38 Special reloading tools; set moulds for 21 diff. lead soldiers. Stamp appreciated. F. Valente, Mansfield, Mass. 1-1-27

FOR SALE—Colt Army Special, cal. .32-20, 5 in. bbl., gold tip sight, $22.00. S. & W. M&P model, cal. .32-20, 6 in. bbl., $23.00. Both guns like new, shot about 50 shots each. F. C. Witte, Virginia, Minnesota. 1-1-27

WANTED—A copy of Sawyer's Book on "The Revolver." State price. Dr. D. T. Layton, 376 Sixth Ave., Brooklyn N. Y. 1-1-27

FOR SALE—N. M. Springfield Lyman 48, 22 HI Power Savage, Lyman Sights, Mauser 8 mm., Lyman on bolt. Officers' Model Colt .38 cal. Colts Auto .32 cal. Leonard Berggren, Alexandria, Minn. 1-1-27

WANTED—Colts C & B Revolvers. Colt Derringers. .38 S. A. Police without trigger guard. Bisley. R. L. Sheeler, 2421 W. Broadway, Council Bluffs, Iowa. 1-1-27

WANTED—Old guns catalogues, gun books, old sporting magazines, "The Rifle" 1885, 1888. Remington .44-40 Revolver. Fred Wainwright, Grayling, Michigan. 1-1-27

WANTED—.30-06 Receiver and heavy barrel, *not* tapped for Lyman. Must be perfect. Also Colt .45 1917. G. H. Collins, Court House, San Antonio, Texas. 1-1-27

TRADE—Savage 22 hi-power takedown, 410 barrel, complete loading set, all in A-1 shape for automatic shotgun. Paul E. Heist, Charlemont, Mass. 1-1-27

COLLECTION OF MODERN WEAPONS for sale. Write for list. Sidney Maranov, 142 W. 38th St., New York City. 6-27

AFTER you have spent your money for mysterious formulas and quick methods of bluing your guns and have met with failure, remember HOFFMAN BLUING SOLUTION which has been on the market for six years, sold with money-back guarantee, which none of our imitators can do. This is the solution used exclusively on all Hoffman Arms Company's fine guns, used by the Frankfort Arsenal and thousands of professional gunsmiths, recommended by Major Whelen in "Amateur Gunsmithing," by Landis, Crossman, Askins, Curtis, and all authorities on firearms. $2.50 per bottle and sold with money-back guarantee, if it does not do what we claim. Hoffman Chemical Co., Ardmore, Okla. 1-27

WANTED—Smith & Wesson .38 Special, target sights, blued finish, S&W monogram on right hand side plate. A. G. Kellenberger, 3502 South 11th St., Tacoma, Washington. 1-1-27

FOR SALE OR TRADE—One Springfield, good shape, $30.00. Another No. 48 Lyman, $40.00. Fine Winchester Schuetzen, Schuetzen triggers fitted with H.M.Pope .33 cal. barrel, perfect,. Also fine target sigths and scope blocks $100.00. Prewar Luger pistol, fine condition, $30.00 to $35.00. Prewar Luger Carbine, a beauty, perfect, $75.00. Original .35 calibre Newton, $40.00. .44 Smith & Wesson American 8 inch barrel, detachable stock, fine condition, $40.00. .44 Smith & Wesson Russian Single Action, detachable stock, extra 16 inch barrel and cylinder smooth bore. Brand new condition, $50.00. 66 Model Winchester, $25.00. .44 Marlin Rifle, new condition, $20.00. 12 ga. Lefever, new condition, $23.00. 16 ga. Fox single trigger, finely engraved, ejector, new, $80.00. V. H. Parker, very fine condition, Lyman sights, 16 gauge, $45.00. In writing inclose stamp. Send 4c in stamps for list of many guns, tools, and cartridges. A. W. Reed, Greenville Junction, Maine. 1-1-27

FOR SALE—Winchester S. S., L. R. octagon 26 inch, single set trigger, imported walnut stock, Swiss butt, Lyman 52-A and 17 sights. Fine condition. WANT—B.S.A. 12, or action. S. A. Hackett, 426 17th St., Oakland, California. 1-1-27

FOR SALE—.32-44 S&W Target revolver, 6½ in. barrel, with extra cylinder without shoulder, for S&W .32 Rifle ctg. Complete Ideal reloading set for same; moulds for target, gallery and rifle bullets; sizing and lubricating die. Lot of empty shells, $40.00. .38 S&W Special, 6½ in. barrel square butt, $25.00. Both guns in crank condition. Hugh Dolan, Pottsville, Pa. 1-1-27

GUNS, new and used. Sell, trade. Send stamp for list and prices. Earl J. Russell, Monmouth, Illinois. 1-1-27

SPORTING STOCKS—Finished and unfinished. Hand made for any bolt action rifle. Also inleted blanks. Not necessary to send barrel or action. We have them here. Stocks for Krag or Springfield from $20.00 to $30.00. Inleted blanks from $10.00 to $20.00. In any wood and any measurements. Stamps for photos. R. D. Tait, Dunsmuir, California. 1-1-27

WANT—Winchester, Stevens, or Remington center fire single shot rifle cal. either .22 W.C.F.; .22-15-60 Stevens or 25-20 S.S. Must be in crank condition. Also Savage 1912 .22 L. R. Auto. rifle. Frank Schott, 4040 N. Kostner Ave., Chicago, Illinois. 1-1-27

B.S.A. 177 Air Rifle. WANT—B.S.A. .22 Air Rifle, target revolvers, Savage Hi-powers, Reloaders, Powder, 12 ga. loading machine, 410 ga. Winchester. Raymond R. Jones, Cozaddale, Ohio 1-1-27

WANTED—Colt's New Service or S.A. State barrel length, condition, caliber, price. K. H. Munroe, 21 E. Holly St., Pasadena, Cal. 1-1-27

SALE—550 7.62 cartridges, $7.50. .45-70 Springfield Carbine, $2.00. U. S. 1917 rifle, no barrel. $7.00. 4.5 power telescope, $19.00. WANT—Springfield sporter, as issued. O. A. Myklejord, Foston, Minnesota. 1-1-27

FOR SALE—Bisley Colt .45 cal., 5½ in. barrel, new and perfect, $40.00. Springfield Sporter with Lyman 48 Receiver Sight, Ivory front, slightly pitted barrel on inside, outside fine, extremely accurate, $22.00. D. B. Conley, Swampton, Kentucky. 1-1-27

FOR SALE—Remington 12-D, N.R.A. Rifle, perfect, condition, fired 30 times. Complete with case, $25.00. George K. Crozer, 3rd, Box 105, Wynnewood, Pa. 1-1-27

FOR SALE—National Match, star-gauged, Springfield rifle, Lyman No. 48, rear sight and sling. Price $40.00. Gun crank condition inside and out. Jas. L. Driscoll, 1215 Hampel St., Oakland, California. 1-1-27

ANGLERS' HAND-MADE landing nets, linen or cotton twine. Let me know what you want. I can sure fix you up. Oscar Radke, Ripon, Wisconsin. 1-1-27

FOR SALE—.30-06 Springfield National Match Rifle, perfect inside and out. Price $30.00. Louis E. Austera, 319 E. 79th St., New York City. 1-1-27

FOR SALE—Winchester 54 '06. Slightly marred stock, otherwise new and perfect, $32.00. Consider powder measure and scales toward same. Glenn A. Avery, Alexandria, S. D. 1-1-27

TRADE—Win. 44, Model '92, good. WANT—.22 Colt, Win. 97, $15.00 or what? A. R. Bentley, Pendennis, Kansas. 1-1-27

FOR SALE—.32-20 Winchester Model 92. Gun crank condition. Reloader. Write for description. $25.00. J. W. Beeler, 3140 Juniata St., St. Louis, Mo. 1-1-27

THE OVR UNDA GUN for trap or field—the greatest improvement in a sporting gun in a generation. Circular on request. Baker & Kimball, 38 M South St., Boston, Mass. 1-1-27

INTERNATIONAL RIFLE TEAM PATCHES of heavy, pure dye, spun silk. Sold only to International Team members. State Team you fired on. One for $1.00; three for $2.50; six for $4.50. Postpaid. J. M. Hilborn, 15 East 26th Street, New York City. 1-1-27

SELL—1,000 cartridges, war-time .30-06, bandoliers, $14.00. 1,000 7.62, military load, $18.00. Joseph Buchwald, 41 Norman St., Waterbury, Conn. 1-1-27

FOR SALE—Separately .25-20 Savage Sporter, No. 48 Lyman sight for Springfield. A. A. Brooks, 26 Chestnut St., Wellsville, N. Y. 1-1-27

FOR SALE—Vlon Spotting Scope, 33 power, first class condition, $20.00. J. H. Ladd, Sheridan, Wyoming. 1-1-27

FOR SALE—Antique pistols, rifles, muskets, swords, powder horns, flasks, war medals, Indian curios. Lists free. Nagy, 8 South 18th St., Philadelphia, Pa., Dept. 8. 1-1-27

FOR SALE OR TRADE—.30 cal. 10 shot Mauser, new selected Match Springfield, some new Krags, .30-'06 ctgs., fine M. L. rifle, original Sharp's bullet mould, new, .44-40 tools. J. Mulvaney, 2438 N. Clark St., Chicago, Illinois. 1-1-27

SALE—.45 S.A. Colt Blued, 7½ in. barrel, Factory New, $27.50. 9 mm. Steyr Automatic Pistol, $18.00. .45 Savage Automatic Pistol Factory New, $30.00. .45 Colt Automatic Pistol, $18.50. Collection of 150 different cartridges, $7.50. Rare and obsolete cartridges for collectors. Send for list. W. S. Lutz, 2133 Cypress St., Phila., Pa. 1-1-27

TRADE—Eastman postcard size kodak and small six power Field Glass for light .30 caliber rifle. M. G. De Gabriele, 111 Peck St., Negaunee, Mich. 1-1-27

COLT .22 Target, new condition, $22.00. Colt .32 Police Positive, 6 inch, nickel, fine, $18.00. Colt S.A. .32-20, blue, 7½ inches, new condition, $22.50. Mauser 9 mm. Military Auto., stock holster, perfect, $20.00. Colt .44 New Service Target, new condition, $32.50. Colt .38 Officers' Target, 7½, new condition, $30.00. Colt .38 D.A. good, $10.00. Winchester 54, .30-06, new condition, 200 cartridges, $37.50. Also all makes of new guns at regular prices. Will take good used guns in trade. Eric Tinsley, 423 So. 4th St., Louisville, Ky. 1-1-27

OFFICERS' MODEL TARGET REVOLVER, 7½ in. barrel. Shot 50 times. Perfect inside and out. $28.00 delivered. Godfrey Lindberg, Fruitport, Michigan. 1-1-27

FOR SALE OR TRADE—12 Ga. double barrel Trap Gun "F" grade, ejector, Jostam pad 1¾ x 2¾ x 14 newly gone over and barrels reblued at factory $70.00 Fecker spotting scope, 2 eyepieces, (single draw type) $40.00. High Grade Springfield sporter (stock of selected Italian walnut) by Owen $80.00. 1,000 rds. .45 Auto ammunition from newly opened case $20.00. .22 Springfield with stock remodeled by Griffin and Howe and with Winchester 5A scope and scope case $75.00. Goerz Helinox Triedar 6x30 individual focus new condition $40.00 Quick draw shoulder by Heiser for .45 Colt auto. $3.00, same for .38 six inch barrel by Hardy $3.00. .45 single shot Springfield (unfired) with Ideal tools 45-70-405, about 75 new cases, some cartridges, and about 100 .45 cal. 300 gr. bullets $10.00. WANTED—Good grade light 12 or 16 ga. double ejector with not more than 2¾ inch drop. Dunlap Roddey, Rock Hill, S. Carolina. 1-1-27

TRADE—Refinished muzzle loading rifle, .38 caliber, accurate; 2 Colts C & B revolvers, 36 and 44, fair condition. WANT—Crossman Air Rifle, air pistol, copy of Dillin's "The Kentucky Rifle," Winchester S.S. .25 or .32. A. H. Johnson, 529 Ottumway St., Ottumway, Iowa. 1-1-27

WANTED—Flint Ky. in good shooting order. Describe completely in first letter. P. P. Quayle, 4601 Stanford St., Chevy Chase, Md. 1-1-27

WANTED—Pair of six power binoculars. Must be in serviceable condition. Gus Causbie, Route 2, Mammoth Spring, Arkansas. 1-1-27

FOR SALE—.45 Colts S.A. Stevens .32-40 Remington rolling block for Free Pistol, same for 12 ga., shotgun, actions only. .32-40 and .45 Ideal moulds. Write for complete description and prices. H. G. Stark, 336 Stedman Place, Monravia, Cal. 1-1-27

250 Bolt Savage, "New." .45 Colt Auto, "used." WANT—Original .256 Newton "action," perfect, barrel condition immaterial. Owen Kintner, Lynwood, California. 1-1-27

Discovery of wonderfully rich gold and silver ore, also a practically unlimited tonnage of sulphur, all on one property, new camp, Nevada. A combined industrial and mining enterprise assuring vast profits. Investigate. Give rope to hope and make a real stake. Particulars—Kerr & Company, Suite 245, Monadnock Bldg., San Francisco, Calif. 1-1-27

SALE OR TRADE—Colt Single Action, Army & Frontier Revolver, cal. .32-20, 7½ in., good as new. A. S. Thorsen, Bottineau, N. D. 1-1-27

SELL—Colt .45 Auto., belt holster, 2 extra clips, excellent. $18.00. WANT—Lyman .34 Krag sight. Wylie, 2 Aberdeen Rd., Arlington, Mass. 1-1-27

FOR SALE—New 1926 Ithaca field grade ejector, super 10 bore, full choke, brand new, $46.75. Arthur E. Anderson, Route No. 1, Fullerton, North Dak. 1-1-27

FOR SALE—Win. 52, as new, $22.50. 5-A Scope, as new, $27.50 . Win. .22 Auto., as new, $20.00. S. J. Lanning, 2015 W. Horne St., Sioux City, Ia. 1-1-27

B. S. A. .22, in fine condition. Fecker four and eight power Winchester mounts, also Lyman with clicks, $60.00 cash. C. Goddard, 1225 Park Ave., New York City. 1-1-27

HANDLOADING AMMUNITION, by J. R. Mattern. A text-book covering all phases of the loading and reloading of ammunition for rifles and revolvers. 380 pages. 117 original illustrations. Voluminous tables of ballistics and 50 pages of load tables for all modern cartridges. A technical discussion on each popular cartridge. Complete instructions for loading to duplicate factory loads, short range and small game loads, big game cartridges and loads to obtain extreme accuracy at all ranges. Everything is original, there is no reprinting of catalog dope. Intensely practical. No shooter should be without whether a handloader or not. Bound in buckram. Price $3.00 postpaid. Small Arms Technical Publishing Company, Box 18, Marshallton, Delaware. 1-1-27

FOR SALE—.32-44 S. & W. Russian Model Target Revolver, rebored by Peterson to .38 S. & W. Special Caliber, very accurate, perfect, $35.00. .38 S. & W. Special Revolver, 4 inch barrel, round butt, new, $20.00. London Colt .36 cal. 7½ inch barrel, in mahogany case with tools, fine condition, $15.00. Dr. Carl W. Wahrer, Physicians Bldg., Sacramento, California. 1-1-27

.30 REMINGTON AUTO., Marbles Sights, perfect, $35.00. .22 Marlin, lever action, Lyman sights, perfect, $16.00. .45 cal., reloading tools, molds, $2.00. WANT—.44-40 reloading tools, moulds. Milo Hutson, Wenatchee, Wash. 1-1-27

PEAFOWL, Pheasants, Bantams, Pigeons, Wild Geese, Ducks. Free circular. John Hass, Bettendorf, Iowa. 1-1-27

WANTED TO TRADE—.38 Police Positive Special (.38 Special), in new conidtion inside and out, for .22 Auto. Colt or Reising pistol, in same condition. C. P. Smith, R.F.D. No. 2, No. 45, Ft. Pierce, Florida. 1-1-27

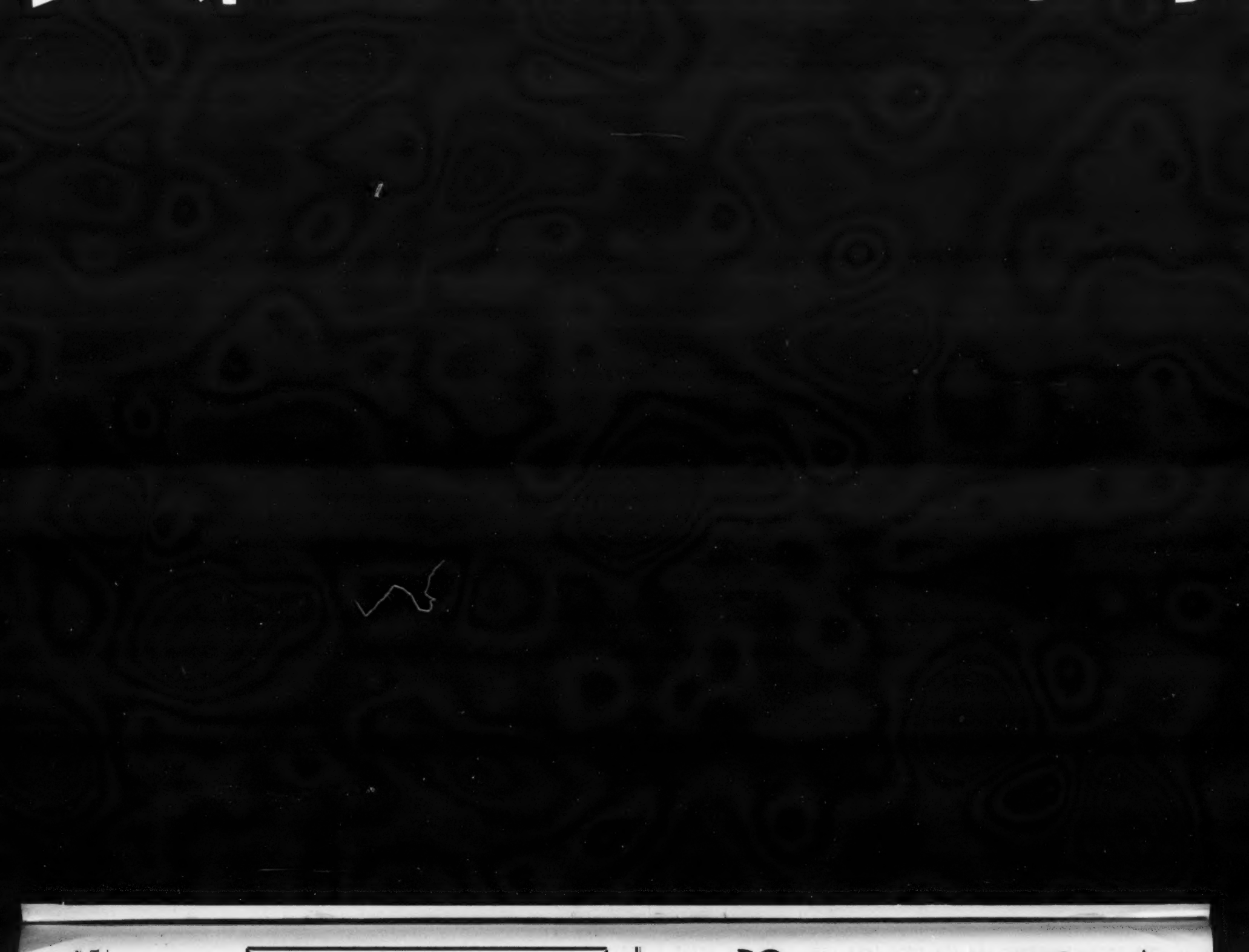
WANT—Stock for U. S. 1917 Rifle. R. Le Myre, 370 Coplin St., Detroit, Michigan. 1-1-27

FOR SALE—Winchester Rifle Model 1903, perfect, with case a dncleaning rod, $22.00. Colt Army Revolver .38, worn but barrel perfect. $19.00. Frank Woodland, 510 Court St., Rochester, N.Y. 1-1-27

SELL—Cylinder and 5½ in. barrel for Colt's S.A. Army .45. Fine condition, $5.00. Wilbur J. Mote, Laura, Ohio. 1-1-27

FOR SALE OR TRADE

Three-barrel gun, 16-gauge by .30-40, Krag Cartridge, brand new, $250.00. Mauser 400-Whelen, brand new 4-power Carl Zeiss scope, $160.00. Mauser .30-06 brand new 4-power Carl Zeiss scope, $150. The above three guns made by Heinrich Krieghoff Suhl, Germany, and imported by me. For Resale in this country. They are very fine goods. .30-30 Marlin Rifle, round barrel, 2/3 magazine, good condition, $15. .32-Special Marlin Rifle, round barrel, 2/3 magazine, good condition, $15. .25-35 Winhcester pistol grip, full magazine, 24-inch barrel, new but shop worn, $35. .32-20 Winchester oct. barrel, full mag., fine outside, fair inside, accurate, $12. .25-20 Marlin carbine, accurate, fair inside and out, $12. .38-40 Winchester carbine, accurate, fair inside and out, 2/3 mag., $12. .38-40 Winchester carbine, accurate, fair inside and out, full mag., $12. .32-40 Winchester carbine, accurate, fair inside and out, 2/3 mag., $13. .30-30 Winchester carbine, accurate, fair inside and out, ½ mag., $15. .38-55 Winchester carbine, accurate, fair inside and out, full mag., $12. .38-40 Remington carbine, model 14½ R, good, $20. .38-55 Winchester rifle, full mag., round barrel, $10. .38-55 Winchester rifle, ½ mag. ,half oct. barrel, $10. .33- Winchester rifle, ½ mag., fair inside and out, $20. .45-90 Winchester rifle, full mag., fine inside and out, Lyman rear, $20. Sharps rifle cartridges, .40-90 paper patch, .40-70, .40-50, .38-50, .40-70 bottle neck, and .40-90. Other kinds, .40-70, .40-75, .38-45 Ballard, .25-25 Steveins, .32 and .38 extra long Ballard, .38- S. & W. gallery, .32- S. & W. gallery, .38-44 Smith & Wesson gallery, .38-70 Winchester, .50-100-450 Winchester. In writing, enclose stamp. A. W. Reed, Greenville Jct., Maine. 1-1-27



A Notable Record of Important Wins

Here are the real bullseye busters for you. Here are the small-bore cartridges with the long record of important wins to their credit—U.S. .22 N.R.A.'s.

When the last shot in any big match is fired and the final scores are tallied, invariably you find shooters of U.S. N.R.A.'s heading the prize-winning procession. It's a habit!

Year after year at the Metropolitan Matches, annually held in New York, shooters of N.R.A.'s have put themselves above other competitors. In 1925, for example, they won four of the first five places in the main event, while in 1926 they annexed the highest three places in both the championship and preliminary matches.

The Spencer match, classic of the annual Eastern Small-Bore Tournament, held at Sea Girt, N. J., has been won during each of the past three years by marksmen who slipped N.R.A.'s into their rifles. Furthermore, these cartridges were used by the shooters who carried away six of the events at the 1926 Interstate Rifle and Pistol Matches, also shot at Sea Girt.

Take the last Olympic and International Small-Bore Matches in France: When the results of that memorable tournament had been compiled, it was found that U.S. .22 N.R.A.'s had made a clean sweep of the boards, winning three world championship events and establishing a world's record.

At the last national small-bore tournament held at Camp Perry, Ohio, U.S. N.R.A.'s again proved themselves the choice of champions, these cartridges being used by forty-nine per cent of the prize winning rifle marksmen. Moreover, seventy-five per cent of the prize winners in the pistol and revolver matches, where commercial ammunition was used, shot cartridges of U.S. make.

There's a partial list from the long, long record of wins registered with U.S. .22 N.R.A. long-rifle cartridges. It proves that these cartridges are, beyond question, the choice of champions. To prove to yourself *why* they are the choice of champions, it is necessary to do but one thing—shoot them yourself. The answer is in the bullseye

US .22 N.R.A.
Long Rifle Cartridges

PRESS OF CHAS. H POTTER & CO., INC., WASHINGTON, D. C.

"Mike's Pill Box"

WHEN a concrete machine gun implacement halted the progress of his platoon at Belleau Bois on October 27th, 1918, Michael J. Perkins, Private, first class, of the 101st Infantry, volunteered to "get" that particular pill box—and get it quick.

Alone, with only a hand grenade and his trench knife, "Fighting Mike" crawled out to the "box", miraculously reaching it in face of grueling machine gun fire. For a moment he waited. Then the door opened cautiously, and Mike let go his grenade, following it with his own fighting self.

Inside chaos reigned as Perkins slashed right and left with his knife. Soon came cries of "Kamerad" and twenty-five Germans with arms upraised, filed out and started for the American lines.

With his charges safely delivered, Perkins was ordered to a hospital to have his wounds dressed but the ambulance was hit by a shell and, alas, the intrepid hero was blown to pieces before he could receive recognition for his gallant deed—the Congressional Medal of Honor which was posthumously awarded him.

E. I. DU PONT DE NEMOURS & CO., Inc.
Wilmington, Delaware

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Du Pont Powder has been inseparably connected with the combat history of every organization in the Service. In 1802, practically all du Pont Powder was made for military purposes. Today, 98% is produced for industrial uses.